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A Study of Alabama Educators' Perceptions of Electronically Delivered Professional Development Modules

Joel Wayne McCay
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Joel Wayne McCay entitled "A Study of Alabama Educators' Perceptions of Electronically Delivered Professional Development Modules." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Instructional Technology and Educational Studies.

Russell L. French, Major Professor

We have read this dissertation and recommend its acceptance:

Edward L. Counts, Gretchen Whitney, Ralph Brockett

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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A Study of Alabama Educators' Perceptions of Electronically Delivered Professional Development Modules

A Dissertation
Presented for the
Doctor of Education Degree

The University of Tennessee, Knoxville

Joel Wayne McCay

December 2004

DEDICATION

This dissertation is dedicated to my parents,

James T. McCay

and

Doris R. McCay

Thanks for all of your support and encouragement throughout my educational life.

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ABSTRACT

The purpose of this study was to discover which technological delivery media (web-based, CD-ROM, PDF documents as downloadable files for print from the Internet) Alabama public school educators select most often for delivery of their own professional development, as learning modules, why they select them, and whether or not they prefer those modes of professional development to the more traditional modes previously experienced. There were 28 participants in this study.

The questionnaire which attempted to assess the role of the media for delivery of professional development learning modules was specifically designed for this research. Demographic information collected from the 28 respondents included grade levels of school, highest degree held, and years of teaching experience. The questionnaire also requested preferences regarding delivery of professional development including: 1) online, 2) CD-ROM, 3) PDF documents downloaded from the Internet, 4) staff development workshops (meetings, conferences, 1-2 day sessions), and 5) college or other formal classes. Descriptive statistics were used to identify patterns in the educators' preferences and perceptions.

Major conclusions of the study were the following: 1) The medium selected most often was online (82% of respondents); 2) Reasons most often cited by respondents for selecting the medium: convenience and ease of access (64%), directed to use the that medium (73%), and control of time/schedule (50%); 3) Online delivery was the most preferred method of professional development, regardless of degree level; 4) For those with 5 years or fewer of classroom experience, online professional development and college coursework were equally as popular as formal college courses (40%); 5) For respondents with 6-10 years of experience, online delivery was the preferred mode (100% of respondents). A majority of respondents with 11 or more years of experience (57%) also selected online delivered as their preferred mode.

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Chapter I

Introduction

Although the United States government began major public school teacher improvement programs in the late 1950s, under the Eisenhower administration, Congress determined that special funding would only go toward science and mathematics teacher programs. The government reasoned that by defining new and higher performance standards for those teachers, America's children would benefit in the classroom and would become more interested in learning these subject areas. As a result, the 1960s marked early stages of the development of systems in which teachers could upgrade their skills and knowledge through continuing education.

Houle (1970) saw the idea of continuing education gaining momentum and popularity across all professions and commented that while continuing education would not cure all the problems of the professions, without it no cure is possible. Indeed, by the 1970s, widespread use of continuing education began to serve as a basis for relicensure and recertification. This trend continued well into the 1980s, and organized and comprehensive programs of continuing education were developed in engineering, accounting, law, medicine, pharmacy, veterinary medicine, social work, librarianship, architecture, nursing home administration, nursing, management, public school education and many other professions (Cervero, 2001).

In 1983, however, the report A Nation at Risk (National Commission on Excellence in Education, 1983), described the performance of American students as lagging behind that of students in other countries. In 1986, as one response to A Nation at Risk, the Carnegie Forum on Education and the Economy established the Task Force on Teaching as a Profession in recognition of the central role teachers play in the quality of education, and issued A Nation Prepared: Teachers for the 21st Century. A crucial element in the report's recommendations was to make teaching a profession of well-educated professionals prepared to assume new powers

and responsibilities to redesign schools for the future. In this context, the report set in motion work leading to the creation of a National Board for Professional Teaching Standards. This Board established high standards for what teachers need to know and be able to do, certified teachers who met those standards, and recognized those teachers who demonstrated that expertise through performance-based criteria (Harman, 2001). For many teachers, National Board certification has now become a professional development opportunity.

In March,1994, while yet on the heels of the 1983 report (A Nation at Risk), Congress signed into law Goals 2000: The Educate America Act, an effort to establish national goals, grants and incentives by which all states could work toward increasing student academic performance. Teacher professional development was recognized as an important aspect of achieving the goals.

By the 1990s, Congress and state-level policymakers placed special emphasis on the importance of 1) standards for teachers and students, 2) school and teacher accountability, and 3) major improvements in teacher professional development and the practices that facilitate good teaching. One focus was on technology, and Congress poured federal money into the redesigning of America's educational infrastructure by inserting computer technology into its schools' classrooms.

As a result of the No Child Left Behind Act of 2001, the professional development of all public school teachers has gained even more emphasis. This legislation emphasizes even greater accountability for schools and educators and seeks to ensure that there are "highly qualified teachers" in all classrooms.

Since 1995, the effort to infuse technology into classrooms has resulted in more than $8 billion in federal funds allocated to placing the latest computer technologies into the hands of educators, connecting every classroom to the Internet, and training teachers to use those

technologies (U.S.Department of Education, Office of Educational Technology, 2001). By fall 2001, 99 percent of full-time regular school teachers in the United States had access to computers or the Internet in their schools (Kleiner & Farris, 2002; U.S. Department of Education, Office of Education Technology, 2001).

However, a gap emerged between teachers having technology and associated media at their disposal and the actual degree to which it contributed to the educator's professional growth. Rowand's (2000) study indicated that fewer than 10 percent of teachers surveyed were currently using the computer for research and best practices, such as professional development and lesson planning. Moreover, 39 percent of teachers using the computer appeared to delegate computer use to the preparation of simple instructional materials such as classroom handouts for students. Another 34 percent used the technology merely for classroom record keeping. One study by Becker and Riel (2000) discovered e-mail to be the most popular use of technology for teachers and suggested that the "staff development effect" may begin to take place and is more present when teachers have a computer both at home and school.

Teacher professional development includes formal training, preparation during teacher education programs, informal experiences, and other learning opportunities. In practice, in-service teachers have traditionally engaged in professional development opportunities through in-service workshops and seminars, attendance at professional meetings and conferences, and graduate coursework. These sessions are usually held in a classroom or meeting environments.

However, there are now new alternatives. Advances in technology have created the opportunity for large scale dissemination of instruction by distance delivery (Bertrand-Hines, 2000) including web-based, CD-ROM, and PDF documents as downloadable files from the Internet. These media now provide new learning opportunities for public school educators through distance delivery of teacher professional development, which can help transfer new

knowledge and research into the hands of teachers.

A paradigm shift in how educators can continue their professional development is emerging. Distance delivery of digitized learning material is referenced by names such as online learning, web-based learning and e-learning, but whatever the labels the focus is clearly on distance learning opportunities. Delivery of professional development through these media channels uniquely alters the learning environment, particularly when there is no instructor or trainer involved in the learning process. Teachers who utilize technology for the delivery of professional development become self-directed adult learners seeking to gain professional expertise through technologically enhanced learning programs.

The Internet and the World Wide Web (the Web) are now enabling the creation of media with a variety of new attributes. These innovations are being integrated into a common distance learning environment that is becoming a mainstream delivery format suitable for many different types of learning activities (McGreal, 1997; Dwyer & Li, 2000; Bertrand-Hines, 2000; Duhaney, 2000).

Effective professional development programs should take into account the nature of adult learners and the need for making learning accessible to them. As adult learners, public school teachers represent 4 percent of the entire American civilian workforce. There are, for example, over twice as many K-12 teachers as registered nurses and five times as many teachers as either lawyers or professors (Ingersoll, 2001). In web-based learning environments, adults prefer to plan their own education objectives, determine the learning activities, and develop the evaluation criteria. Programs designed for adults allow learners to exercise choice and control of their personal learning, sequence the content, select the mode of instruction, and assess their own progress (Ashton, Bland, & Rodgers, 1995; Driscoll, 1998). The question becomes how can a school, a school district, or a state, deliver professional development into the hands of educators,

at the right time, whether they are at school or at home?

Statement of the Problem

Delivery of teacher professional development by technological means is relatively recent. Even newer is the idea of giving educators instantaneous choices among technological delivery of media. Therefore, little research has been conducted into the ways in which educators, as adult learners, approach the use of the technology available to them, the choices they make when choices are available, or their reasons for those choices. Research is needed if technological media are to be used wisely and effectively to improve teacher knowledge and skills. This study will provide some of that research.

Purpose of the Study

The purpose of this study was to discover which technological delivery media (web-based, CD-ROM, PDF documents as downloadable files for print from the Internet) educators select most often for delivery of their own professional development, why they select them, and whether or not they prefer those modes of professional development to the more traditional modes previously experienced.

The study also examined some selective demographic factors that could influence educators' perceptions and their choices of the media used for learning new knowledge and skills. These variables include grade levels of school, years of teaching experience, and highest degree received.

Setting of the Study

This study addresses the choices made by educators in Alabama public school systems when they were given an opportunity to access professional development, as learning modules, through one or more of three media: web-based; CD-ROM, and PDF documents as downloadable files from the Internet.

Introducing The Modules To Schools

The Professional Development Modules created for the Alabama Professional Educators Personnel Evaluation (PEPE) program were introduced to the Alabama public school systems during 2003. There were 15 modules completed. They included the following topics:

- Selecting and Stating Long-Range Goals and Short-Term Measurable Objectives
- Selecting and Using Instructional Resources to Enhance Instruction
- Planning, Preparing, and Administering Classroom Tests
- Aligning Curriculum, Instruction, and Assessment
- Test Development: True-False (Forced-Choice) Questions
- Test Development: Short Answer & Completion Questions
- Test Development: Matching Questions
- Test Development: Multiple-Choice Questions
- Test Development: Essay Questions
- Item and Test Analysis
- Scoring Performance Assessments: Checklists, Rating Scales and Rubrics
- Classroom and Behavior Management
- Implementing PDP Objectives and Activities
- Parent Conferencing and Parent Involvement

All modules were available in three formats: (1) online (web-based), (2) CD-ROM, and (3) downloadable files from the Internet in Adobe PDF format for print. CD-ROM versions of the modules were available as hybrid CDs for cross-platform (MAC/PC) use. Choice of format was the educator's decision. In some cases, educators were assigned a module or modules as professional development to correct a deficiency identified in their performance evaluations. In other cases, educators self-selected modules for professional development in areas in which they desire to study.

Organization of The Alabama Professional Development Modules

When Alabama educators accessed modules from either the CD-ROM or connected to the Internet, they utilized their Web browser, usually either Internet Explorer or Netscape. The browser initially took the educator to the module's Main Table of Contents. From there, the educator selected the module he/she wished to use from the list of module topics in the main table of contents. Every topic within the main table of contents was a clearly labeled link. Once a module topic was selected, the educator's browser took him/her to the opening page of the module, and the educator could begin study. Every module was designed with a similar format which includes the following sections:

Section A: introduction to (the name of the selected topic)

Section B: an information section containing the content to be learned

Section C: an interactive self quiz titled "Check Your Knowledge"

Section D: an interactive practice activity

Section E: classroom application

Section F: references and resources

Design of The Study

Three research questions formed the framework for the investigation.

1. When given choices among technological delivery of professional development (Web-based, CD-ROM, downloadable files), which medium do educators select most often and why?

2. Do educators at this point in time express greater preference for self-paced, technology delivered professional development than for more traditional forms (workshops, seminars, college courses) of professional development activities? Why or why not?

3. Are there differences in the preferences of educators regarding delivery of professional development based on grade levels of school, highest degree held, and years of teaching experience?

Data pertinent to each question were collected via a survey completed by each educator who completed a module. Following are descriptions of the study population and sample, development and content of the survey instrument, presentation of the research questions, and explanation of how data pertaining to each question were assembled and analyzed.

Study Population and Sample

Theoretically, the study population in this project consisted of all Alabama public school (P-12) educators. However, the sample actually used for the research were all educators in Alabama public school systems who completed one or more modules and an online or hard-copy version of an evaluation questionnaire provided by the project staff (which, included the investigator) prior to April 15, 2004. It is unlikely that all module users completed questionnaires because the actual sample included 28 educators. Several of the 28 participants were assigned module(s) as readings for college courses while other respondents had been directed to complete them by their principals.

The Survey Instrument

An instrument was developed because there was no employable instrument available. The modules used by Alabama educators were developed under the state's Title II grant from the United States Department of Education. Their purpose is to complement the Alabama teacher evaluation system, which yields data about each teacher's relative instructional strengths and weaknesses. The module project included a two-part survey, one part consisting of demographics and the other part containing items not related to this study. The primary purpose of that survey was to gain educator feedback about the content and format of the modules. To prevent educator module users from being bombarded with multiple surveys, forcing them to repeat such items as demographic sections, project staff granted the researcher permission to add items to the original survey and to use certain demographic items which would have been duplicative items in the two surveys. A copy of the enhanced survey used for this study can be found in Appendix A.

Items added to the survey included Section D consisting of a series of eight questions related to users' opinions about technological delivery media. The eight-item section was one in which the respondent marked one of five Likert-type values for a statement, varying from strong agreement to strong disagreement. Responses were converted to the numerical values of 1, 2, 3, 4, and 5 for statistical analysis.

Section E was also a new section of the survey, added by the researcher. It includes 6 questions related to opinions on delivery method. Items 1, and 3-5 relate to prior experience of educators, technological delivery of material and delivery methods available to them, and reasons for using methods. The respondent could check all that apply. The second question is a rank-order of five methods appropriate to receiving professional development. The respondant is asked to rank the methods from 1-5 with 1 being the highest ranking. Item 6 is an open-ended

question allowing respondents to list other reasons for decisions than those previously listed by the researcher.

Survey Distribution

The survey could be completed and submitted in five ways: 1) online completion and submission, 2) submission of hard-copy downloadable from the CD-ROM for printout, 3) submission of hard-copy downloadable from the Internet for printout, 4) completion and submission of available pre-printed hard-copies, and 5) e-mail submission. Respondents found a clearly labeled hyperlink section (containing four hyperlinks) within every module enabling them to complete the survey. Two hyperlinks led to an online survey, which could be filled out and submitted online via Internet connection. One was labeled for Netscape version 4 and older browser users and the other was labeled for Netscape version 6 and Internet Explorer users. Separate links ensured browser compatibility with the survey. The other two hyperlinks included one for printing out a Microsoft Word hard-copy of the questionnaire to manually fill out, and the fourth hyperlink allowed the respondents to fill out and e-mail the questionnaire. However, if an Alabama educator's choice of delivery was a CD-ROM, a survey was accessible and was located on the CD-ROM and available for printing directly from the CD-ROM. Pre-printed hard-copies of the survey were available at Alabama schools for those educators who did not wish to utilize the Internet or the CD-ROM.

Analysis of Data

The first objective of this study was to identify which technological delivery medium (web-based, CD-ROM, PDF downloadable files from the Internet for print) educators selected most often for delivery of their own professional development. The second objective was to

identify why they selected them. A third objective was to determine whether or not educators preferred technological modes of professional development to the more traditional modes previously experienced.

When completed instruments were received by the researcher, they were screened and assigned an identification number. Responses from data collected were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) computer software. Responses were reported without identification of the educator, school, or school system. Descriptive analyses were employed to answer the research questions, which focused on the above mentioned objectives.

The study also examined some selective demographic factors that could influence educators' perceptions and their choices of media to learn new knowledge and skills. These variables included grade levels of the educator's school, years of teaching experience, and highest degree received. Responses were organized and analyzed by research question. Relationships of survey items to research questions and descriptions of analysis procedures follow.

Research Questions, Data Sources, and Data Analysis

Research Question 1:

When given choices among technological delivery of professional development (Web-based, CD-ROM, downloadable files), which medium do educators select most often and why?

The researcher assigned an identification number to each of the returned questionnaires. Frequencies and percentages for responses to items A9, A9b, E3 through E5 were calculated.

Research Question 1 used questionnaire items from Section A, questions 9 and 9b, to answer the first part of Research Question 1 (which media do educators select most often). Item A9 identified which format or combination of formats, including Online (web-based), CD-ROM, and PDF documents (print format) was used in completing the module for which the educator completed the questionnaire. Item A9b clarified which method was predominant for those participants who checked more than one response to item A9.

To answer the second part of Research Question 1 (why participants chose that medium) responses to items 3, 4, and 5 from Section E of the questionnaire were analyzed. The analysis of responses to item E3 (five delivery methods available) and E4 (statements a through f in choosing the delivery method) included the frequencies and percentages for each item. Responses were listed from the highest number to lowest. Responses to question E5 were handled in the same way, by calculating frequencies and percentages, then ranking the responses from highest to lowest percentage.

Research Question 2:

Do educators at this point in time express greater preference for self-paced, technology delivered professional development than for more traditional forms (workshops, seminars, college courses) of professional development activities? Why or why not?

This question focuses on respondents' opinions in their preferences between electronic delivery versus traditional methods. Questionnaire items used included Section D, items 2, 6, and 7 and section E item 2. Question E2 asked participants to rank-order their preferences for online, CD-ROM, printed modules, workshops, and formal classes as methods of delivery for professional development. A ranking of "1" for a method indicated a participant's preferred

method of delivery. The number of rankings of "1" for each method were compiled to answer the first part of Research Question 2.

Items D2, D6, and D7 used five Likert-type values, with statements varying from strong agreement to strong disagreement. The highest value, "5" was used for Strongly Agree, the value, "4" was used for Agree, the value of "3" was used for Neutral, the value of "2" was used for Disagree, and the value of "1" was used for Strongly Disagree.

Responses to items D2, D6, and D7 were averaged separately to show if the mean was higher or lower than 3, a neutral rating on the Likert-scale. The mean rating determined if, at this point in time, educators expressed greater preference for self-paced, technology delivered professional development than for more traditional forms of professional development activities.

The same process was repeated to answer the "why" part of Research Question 2. To answer why educators at this point in time expressed greater preference for either self-paced, technology delivered professional development or for more traditional forms of professional development, responses to items 1, 3-5, and 8 from Section D of the questionnaire were analyzed.

Research Question 3:

Are there differences in the preferences of educators regarding delivery of professional development based on grade levels of school, highest degree held, and years of teaching experience?

Research Question 3 identified any differences in preferences that existed among educators in regard to selected demographic variables. Demographic variables used for Research Question 3 included grade levels of school, highest degree received, and years of teaching experience (section A, questions 3, 5, and 7). Educators' preferences were addressed in section

E, question 2. Gender was not included in this study because of the disproportionate number of males (4 males and 24 females).

Data for Research Question 3 were presented in tables using frequencies and percentages because Chi-square analysis could not be used, given the small number (28) of survey returns. Demographic variables including responses to items 3, 5, and 7, in relationship with responses to Section E, item 2 (the ranking-order question), were used to find differences in preferences of delivery method (web-based, CD-ROM, PDF print material, staff development workshops, and college courses) among the various sub-groups. Each respondent was counted only once, as preferring 1) Online (web-based instruction), 2) Instruction through CD-ROM delivery, 3) Instruction through printed (hard copy) modules, 4) Staff development workshops (meetings, conferences, 1-2 day sessions), and 5) College or other formal classes.

Basis For The Study

As the world moves into the information age, so does the notion of distance learning. Telecommunications networks have the potential to change the nature of learning and have created opportunities for large scale dissemination of instruction by distance delivery (Schrum, 1995; Bertrand-Hines, 2000). At first glance, distance delivery of web-based learning would seem to be the ideal venue for adult learners who typically have real-life experiences; who respond to real-world situations; who can learn regardless of their age; who learn in a variety of ways; and who are managers of their own time (Adapted from Driscoll, 1998, 2002; Caffarella, 1994, 2002; Caffarella & Merriam, 2000; Guskey, 1995, 2000; Knowles, 1975, 1990; Korthagen, 2001; Merriam & Brockett, 1997). But used as a method to transmit information or meet learners' needs, is a web-based learning environment truly an enticing delivery channel for adults, particularly adults in a profession such as teaching?

Increasingly, educators are being held accountable for their instructional practices and the impact of their instructional practices on learners. Staff development or professional development programs are seen as vital links in improving instruction and student achievement and as a strategy for professional growth. However, lack of financial resources, lack of teacher time, and lack of professional development opportunities directly related to each educator's unique needs have limited these strategies and efforts to deliver meaningful programs.

It would seem that the current state of technology and associated media, what is known about adult learners, and the need for new and different approaches to teacher professional development can and should be brought together to enhance the American educational system. However, relatively little is known about the relationships among these variables. There are few studies of how educators use electronic media in a professional development capacity. This study can supply some vital knowledge.

Limitations of the Study

This study was limited by the following factors:

1. Data used in the study were self-reported by educators. The study relied on participants to report truthfully and accurately about their learning experience.

2. Responses represented educator perceptions of their learning. These perceptions may or may or may not accurately represent what actually occurred in a given learning session.

3. The study was limited by the questionnaire itself and the completeness with which it addressed the issues and concerns.

4. The data used in this study were those reported by 28 module users who completed the post-module survey and they may not represent the experiences of users' who did not complete the survey.

5. Results of the study cannot be generalized beyond the state of Alabama.

Delimitations

Respondents were limited to Alabama educators who completed one or more professional development modules and the related questionnaire.

Importance of The Study

Since no previous research has been directly conducted on this subject in Alabama, the present research represents the first attempt to study the delivery of professional development topics as web-based learning, CD-ROM, and downloadable files from the Internet. The importance of this study is three-fold. First, the study introduces the choice of delivery of professional development material through digital media to public school educators in the state of Alabama, and the choices made will be identified. Second, this study examines Alabama educators' perceptions of the use and preference of media used. The data may serve as useful information for future program planning and improvement of educator professional development programs which is on-going in Alabama. More importantly, it is hoped that this study may be meaningful and helpful to those engaged in developing learning material and communicating knowledge to adults by technological means, particularly online learning, including state departments of education, school systems, and universities who are delivering or planning to deliver pre-service education or in-service professional development to educators. Finally, the recommendations and suggestions based on the perceptions of Alabama educators regarding professional development may serve as a theoretical guide for future study. Understanding educators' perceptions of delivery of professional development presented as digital media may help further clarify the nature of educator professional development in general.

Definitions of Terms

The following definitions will be used in the study, and were borrowed from sources commonly available in the fields of adult education, instructional technology and curriculum design and media design, educator education, organizational training (HRD), and other fields of technology:

Downloadable Files:	Software or files available from the Internet.
Professional Development:	Activities to enhance professional career growth.
Module:	Self-contained digital learning material designed with information and applicational activities to learners.
Web-based Module:	A system for delivery of learning modules through the World Wide Web and CD-ROM
PEPE:	The Alabama Professional Educators Personnel Evaluation Systems.
Portable Document Format (PDF [file]):	A special file designed to specify printable pages. PDF files are optimized for letter-sized sheets of paper, rather than for displaying in a browser window.
Self-Direction [In Learning]:	Both the external characteristics of an instructional process and the internal characteristics of the learner, where the individual assumes primary responsibility for a learning experience (Brockett and Hiemstra, 1991, p. 24).

Organization of the Study

This study includes five chapters as follows:

Chapter I introduced the study, provided a theoretical framework for the study, presented the context in which the study was conducted, stated the problem addressed, identified

the specific purpose of the study, overviewed the methodology and procedures, elaborated the study's limitations, delimitations, and importance, and presented glossary of terms.

Chapter II contains a review of the literature related to three topic areas including teacher professional development, adult learning (in relation to teachers as self-directed learners), and e-learning (in relation to media and delivery mechanisms).

Chapter III presents in detail the method and procedures used in this study, including a step-by-step account of what was done, how, and why.

Chapter IV presents the findings of the study.

Chapter V provides conclusions based on the findings of the investigation, discusses implications and offers recommendations for further research.

Chapter II

Review of the Literature

Introduction

This chapter reviews literature on educators as adult learners and their receptivity to professional development and computer technology related to the delivery of various media for professional development within a distance learning environment. Material from the literature is synthesized in this chapter to provide a better understanding of teacher willingness or readiness for technological delivery of ongoing professional development.

The characteristics of adult learners provide the conceptual framework for investigating the delivery of professional development for educators through self-directed learning modalities. This literature review begins with a focus on Alabama's PEPE system and then addresses the adult learning characteristics of public school educators. This chapter also considers the current delivery methods used in educator training and professional development through the new paradigm of digitalized delivery of professional development, as well as related strategies within the context of distance learning.

The conceptual basis for this research study is supported by the literature on adult learning, continuing education for public school educators, and distance learning environments. The major theoretical research areas include a review of self-directed learning as it relates to the delivery of professional development for educators in a distance learning environment. Theoretical discussions extend to today's practical challenges, suggesting that motivating adult learners as self-directed managers of their professional development and the incorporation of learning strategies are among our most pressing challenges (Lawler & King, 2003). Research examining public school educators using the delivery of digitalized professional development such as online learning has only begun to be investigated (Schrum, 2000). New technology and

choices among media are becoming more readily available, affordable, and standardized in education (Barron & Orwig, 1995), but the federal *No Child Left Behind* legislation signed into law on January 8, 2001 emphasized that educators acquire high-quality professional development activities incorporating the latest technologies by 2005-2006. This legislation has increased the struggle to keep pace with educational technological advancements considering that traditionally, training in computer technologies for educators has focused primarily on increasing teachers' technical skills and proficiency such as using a software application to quickly print hand-outs for students or to maintain student grades (Ertmer, Johnson, & Lane, 2001; Zhao, Pugh, Sheldon, & Byers, 2002).

Background of Alabama's PEPE Program and Teacher Professional Development Modules

Alabama's State Board of Education believes that research has consistently indicated that excellence in schools is directly related to the performance of their administrators and teachers. It further believes that school districts that implement strong performance evaluation programs, linked with provisions and opportunities for professional growth and development, obtain marked improvements in educational quality. Educators do their jobs better and students excel both personally and academically. As a result, community support for schools escalates proportionately (Walters & Malo, 2003).

In Alabama, statewide teacher performance standards and an evaluation system for measuring teacher performance against established standards are the foundation for improvements in instruction. Since Alabama's State Board of Education believes that an accountability system drives change, it requires teachers to demonstrate what they know and can apply. The teacher evaluation requirement includes novice teachers and experienced teachers

alike, and teacher evaluations result in structured, individualized professional development plans that target areas for instructional improvement for each teacher. To help ensure successful improvement for teachers, Alabama utilizes various strategies including the Professional Education Personnel Evaluation Program (PEPE) and Alabama Professional Development Modules (APDM), developed through Alabama's Teacher Quality Enhancement (Title II) Project.

Professional Education Personnel Evaluation Program (PEPE)

Alabama's Professional Education Personnel Evaluation (PEPE) program addresses the resolution adopted by the State Board of Education in 1988, establishing policies and procedures requiring a professional education personnel evaluation system in each local school system. The Board's resolution required the evaluation of all professional public education personnel either by a state-developed evaluation system or by one which a school system may opt to formulate pursuant to Board-established criteria.

The mission of PEPE is to assure excellence in education in Alabama's public schools. The primary purpose of the program is to assist educators through the process of performance evaluation and professional growth to deliver quality education services that lead to increasing student achievement (Walters, 2003). Thus, the evaluation program's primary goal is the improvement of teaching and learning; and it seeks to effect growth, collegiality and assistance as opposed to dismissal or demotion (Walters & Malo, 2003).

The resultant approach utilized through the PEPE program is a salient departure from numerous other evaluative approaches currently in use in many school systems nationwide. Rather than focusing on personal traits, which may or may not relate to the quality of performance, the program concentrates on competencies and knowledge/skills which effective

educators are known to possess (Walters & Malo, 2003). Thus, the PEPE Program itself is a multi-data source evaluation program, and an individual's performance data are gathered using more than one form of assessment (Miller & Bohannon, 2003). As an outcome of the evaluation process, all educators develop professional development plans based on their PEPE evaluations. The professional development planning process allows educators to select and target specific personal and professional objectives, particularly in areas of desired improvement.

Alabama's Teacher Quality Enhancement Project

The Alabama's Teacher Quality Enhancement Project, which was awarded a three-year Title II grant from the federal government, works in conjunction with the PEPE Program. That funding allowed the state the opportunity to improve public education by improving teacher effectiveness. The Alabama Teacher Quality Enhancement Project is charged with strengthening the teacher component of the Alabama Professional Education Personnel Evaluation (PEPE) system and also to develop and implement a targeted professional development plan for teachers.

In attaining the project's goals, Alabama continues to strive for highly competent teachers. One new program aimed at this goal was implemented through the PEPE program, and part of Alabama's Teacher Quality Enhancement Project Title II funding was allocated to development of the Alabama Professional Development Modules (APDM). These learning modules were initiated to help improve the overall level of teacher quality and competence in Alabama (Miller & Bohannon, 2003) in accordance with the teacher performance standards (competencies and indicators) that are the foundation for the PEPE teacher evaluation system.

Alabama Professional Development Modules (APDM)

The Alabama Professional Development Modules (APDM) consist of a number of segments of teacher instruction existing on the PEPE website and on CDs. They are intended to provide knowledge and skills directly related to the competencies and indicators which are the foundation for the Alabama teacher evaluation system. The modules are based on research in effective teaching, and they offer one approach to professional growth (Morton, 2004).

Section Summary

The Alabama PEPE evaluation systems for teachers and others were developed in response to a 1998 State Board of Education resolution. PEPE evaluations and related professional development planning and implementation are one part of Alabama's P-12 accountability program. The PEPE evaluation systems focus on competencies and knowledge and skills of educators. Their goal is to assist educators, through the process of performance evaluation and professional growth to deliver quality education services. The Teacher Quality Enhancement Project provided funding through a Title II grant to augment the PEPE program with targeted professional development opportunities, such as the Alabama Professional Development Modules (APDM). The modules, delivered via the Web and CD-ROM, have been developed as one strategy teachers can use as part of an overall professional development plan to improve their knowledge and skills in competency areas identified for improvement through the PEPE evaluation process. Hence, performance assessment is coupled with a strong professional development program.

This background becomes important in understanding who is using the Alabama Professional Development Modules and under what conditions:

- Module users are primarily inservice Alabama teachers (adult learners in a specific professional setting).
- Teacher users of the modules were either assigned modules (one or more) by their supervisors as a means of improving weaker areas of performance identified through PEPE evaluations, or they choose to complete modules as a means of improving certain areas of knowledge and skills, either defined through PEPE evaluation or self-defined.

Public School Educators as Adult Learners

Public school educators are in constant need of continuing professional development opportunities to stay current with changes, acquire new information, and to update knowledge. By seeing continuing professional development as a form of adult learning, the focus shifts to the educators' individual, organizational, and personal needs (King & Lawler, 2003).

The concept of adult education in American society gained prominence in the early 1920s when the title "adult education" became an established field of its own (Houle, 1992). Merriam and Brockett (1997) point out that adult education can be distinguished from adult learning, and stress it is important to do so when trying to arrive at a comprehensive understanding of adult education.

Adult learning is a cognitive process internal to the learner; it is what the learner does in a teaching-learning transaction as opposed to what the instructor does. Learning also includes the unplanned, incidental learning that is part of everyday life. Browsing the Web at home, for example, can be differentiated from on-the-job instructor-led Web-based training. While the experience of browsing the Web may involve learning, the experience may not have been originally designed to bring about learning.

Across all professions, the notion of lifelong learning has now become fused with professional development. However, in its early years, lifelong learning through adult education has been a basic principle of the progressive education movement and has been viewed as a social intervention to help uplift the working class (Stubblefield & Rachal, 1992). In 1916, John Dewey recognized the essential nature of society improving itself through education. He argued that an education was truly lifelong and stated that education must be a "continuous growth of the mind and a continuous illumination of life," (as cited in Elias & Merriam, 1995, p. 55). In Eduard Lindeman's classic book, *The Meaning of Adult Education* (Lindeman, 1989), he argued that the whole of life is learning, therefore education can have no endings. Today's work environment has become more information-based, and as society becomes more a society of people linked by communications technology, there is a need for all individuals not only to be better educated, but to be continuously learning (Moore & Kearsley, 1996). It is estimated that almost 50% of adults in America are currently engaged in some form of ongoing learning (Gruber, Wiley, Broughman, Strizek, & Burian-Fitzgerald, 2002). Two major concepts associated with American adult learning include andragogy and self-directed learning (Merriam & Brockett, 1997).

Andragogy

Adult educator Malcolm Knowles introduced his concept of andragogy in the mid-1960s and expanded on it over 30 years. By the 1970s, a trend in training environments moved toward a perspective of adult learners as capable of self-direction, able to plan and organize their own learning, and able to proceed with the kind of self-reliance they develop in other areas of their lives (Hedge, 1993). Knowles argued that andragogy encouraged a proactive approach to learning in which inquiry and autonomy are predominant features (Rossi, 2002), which allowed

instructors to structure lessons which are part of a relevant learning environment for adult learners (Fidishun, 2000). Andragogy is based on six assumptions about the adult learner (adapted from Knowles, 1990; Quinn, 1995, as cited in Rossi, 2002):

1. The learner's need to know:
   Adults need to know why they must learn something.

2. The learner's self-concept:
   Adults have a self-concept of being responsible for their own decisions and their own lives, thus adults take responsibility for their own learning and are self-directing.

3. The role of the learner's experience:
   Adults have greater and more varied experience which serves as a rich resource for learning. In adult learning, emphasis should be placed on individualization of teaching and learning strategies, experiential learning, and peer-helping activities.

4. The learner's readiness to learn:
   Adult readiness relates to the things that he/she needs to know and do in real life.

5. The learner's orientation to learning:
   Adults have a life-centered orientation to learning involving problem-solving and task-centered approaches.

6. The learner's motivation:
   Adult motivation is largely internal, such as self-esteem, quality of life, and job satisfaction.

To Knowles (1975, 1990), the most meaningful learning capitalizes on the self-directed, autonomous nature of adults. Knowles reasoned that it was because adults have accumulated life experiences that they progressed from dependency learning environments, as children do in public education, toward self-directing ones where new learning is driven by internal rather than external motivations. Although much discussion has occurred over the years on what andragogy entails, Rachal (1988) suggested that the term 'self-directed' be substituted for andragogy.

Self-Directed Learning

The concept of self-directed learning, in its broadest meaning, describes a process in which adults decide what they want to learn, and take the initiative, with or without the help of others in diagnosing their learning needs, formulating learning goals, selecting learning resources and activities, choosing and implementing appropriate learning strategies, and evaluating their learning outcomes (Knowles, 1975; Merriam & Caffarella, 1991; Brookfield, 1986).

This statement embraces a major theoretical concept: Adult learners, as self-directed human beings, possess rich prior experiences, have a readiness and orientation to learn related to the roles and responsibilities of adult life, and are internally motivated (Korthagen, 2001; Knowles, 1990; St. Clair, 2002; Pattison, 2001; Hodgson & Kambouri, 1999). These experiences are influenced by the unique past of the learner as well as the current context (Miller & Boud, 1996).

Self-directed learning is influenced to a great degree by a humanistic philosophy which posits personal growth as the goal of adult learning (Caffarella & Merriam, 1999) and implies both a philosophy and a process (Candy, 1991). The philosophy or goal is that of personal autonomy and self-management of learning, the willingness or capacity to conduct one's own education. Self-directed learning is also an activity or process that allows the independent pursuit of learning and learner control of goals, instructional strategies, content, pace, and evaluation (Candy, as cited in Snell, 2000).

From the perspective of the individual, Houle (1961) provided the first research study of participation from the point of view of the individual rather than the agency or population involved (Brasfield, 1974). In his case studies of individuals involved in continuing education programs, Houle (1961) described three groups of learners according to reasons given for participation including:

1. Goal-oriented: those who use education to achieve clear-cut objectives.
2. Activity-oriented: those who participate for reasons unrelated to the content of the course.
3. Learning-oriented: those who seek knowledge for its own sake.

Cross (1981) pointed out that research generally supports the notion that most adults who voluntarily undertake a learning project do so more in the hope of solving a problem than with the intention of learning a subject.

While learning opportunities come in many sizes, shapes, and forms (Merriam & Caffarella, 1999), self-directed learning occurs most often in learners' natural settings and is initiated and carried through primarily by the learners themselves (Candy, 1991; Merriam & Brockett, 1997) leading to desirable kinds of change (Usher, Bryant, & Johnston, 2002).

Every professional relies, at least occasionally and briefly, on self-directed study; some individuals virtually make it a way of life (Houle, 1984). As the concept proliferated, numerous other labels that have added to the complexity and perception of the concept of self-directed learning including self-planned learning, independent learning, self-education, self-direction in learning, self-directed learning, learner self-direction, self-instruction, self-teaching, autonomous learning, self-paced modules, distance learning, programmed learning, and computer-based training (Brockett & Hiemstra, 1991; Knowles, 1975, 1990; Piskurich, 1993). Realizing confusion among terminology and interpretations, Stockdale, Fogerson, and Brockett (2001) suggested using self-directed learning as the umbrella term.

Characteristics of Adult Learners

As a cognitive process internal to the learner, adults are motivated to learn as a response to problems or when they want to make changes in their work life, and learning can take place in

any setting (Brookfield, 1986; Driscoll, 1998; Merriam & Brockett, 1997). Though the techniques of systematic self-education have not been specifically taught to most professionals, the concept of self-directed learning is a strategy and process with an underlying set of characteristics, including the following characteristics of adult learners (adapted from National Research and Development Centre for Adult Literacy and Numeracy in the United Kingdom, 2003; Driscoll, 1998, 2002; Caffarella, 1994, 2002; Caffarella & Merriam, 2000; Imel, 1988; Guskey, 1995, 2000; Knowles, 1975, 1990; Korthagen, 2001; Merriam & Brockett, 1997; and, Verduin & Clark, 1991):

Real-life experiences: Learning is a characteristic of all real-life activities in which people take on different roles and participate in different ways. Adults bring a wealth of real-life experience to new learning opportunities that can be a resource for learning. People learn by engaging in practice and remaining realistic and readily able to relate new facts to past experiences and enjoy using their talents and knowledge to explore learning in new ways.

Life-centered learning: Adults are motivated to learn when they encounter problems and issues based on real-life problems and actual situations, and think about ways of resolving them. Their daily lives are directly linked to real-world present situations and they prefer problem-specific remedies rather than broad subject content.

Continuous learners: Adults are continuously learning to solve problems and negotiate changes in their lives to solve daily challenges. They look for learning opportunities, at the time it is needed. Adults can and do want to learn, regardless of their age.

Varied learning styles: Adults have the ability to learn about their own learning processes and are able to learn how to learn. For instance, there are different learning styles which people synthesize in any situation. Adults prefer to learn in a variety of ways, and there is

no one "correct" method of learning. Learning experiences can derive from a variety of resources.

Responsibilities beyond the training situation: Adults have many responsibilities such as family, job, and community responsibilities. These responsibilities will often prevent them from giving their full attention to a learning situation. Adult learners appreciate varied learning methods that offer alternatives or choices because of their own busy schedules.

Manage their own learning: Adults prefer to plan their own educational objectives, determine the learning activities, and develop the evaluation criteria. Adults wish to be allowed to sequence the content, select the mode of instruction, and assess their own progress. Adults are most motivated to learn when a variety of methods and strategies are at their disposal, and motivated as they experience needs that learning will satisfy.

Learning based on complex internal and external motivational forces: Adult learning is a cognitive process internal to the learner and also includes the unplanned, incidental learning that is part of everyday life. Learners increase their effort when motivated by a need, an interest, or a desire to learn. They are also motivated by the relevance of the material in relation to their own needs and interests.

All adults have varied experiences and backgrounds. While each adult is an individual, the listed characteristics are common to adult learners. However, while one or more of the characteristics of self-direction may be present within an adult learner, it is generally accepted that the successful self-directed learner must assume a "degree" of active control over the learning process (Long, n.d.; Lowry, 1989; Rossi, 2002). By becoming his/her own manager of learning opportunities, the learner has control over the what, who, where, when and how of learning (Snell, 2000).

Educators As Self-Directed Managers of Their Own Learning

As managers of their own learning, educators take control over the planning and carrying out a variety of learning activities including: determining objectives for learning, deciding on the content of a learning program, selecting methods, self-monitoring of progress, and self-evaluation (Holec, as cited in Hedge, 1993). When learners take responsibility for their own learning opportunities, having control over learning becomes very important. Self-directed learning is a strategy that provides the learner with that control.

Hiemstra (1994) suggested that one's own control over learning efforts is a form of personal ownership with two attributes: 1) most adult learners desire to assume personal ownership for their own learning, and 2) adult learners are capable of taking personal responsibility for their own learning and assuming an increasingly larger role throughout the process. Yet, many traditional professional development situations limit opportunities for such personal involvement because control over content or process remains in the hands of lecturers or designers who depend primarily on didactic or teacher-directed approaches. In essence, they create barriers to learners assuming personal ownership and thereby foster resistance to self-direction in learning.

Brockett and Hiemstra (1991) view personal responsibility as a cornerstone of self-directed learning. This means that learners have choices about the directions they pursue as learners. Drawing on assumptions of humanistic philosophy, the concept of personal responsibility includes three central tenants in the method of self-directed learning. First, this means that individuals assume ownership for their own thoughts and actions in the learning transactions. Within the context of learning, "it is the ability and/or willingness of individuals to take control of their own learning that determines their potential for self-direction" (p. 26). Second, they suggest that an emphasis on personal responsibility for self-direction in learning

implies that "the primary focus of the learning process is on the individual, as opposed to the larger society" (p. 27). They point out that someone who assumes personal responsibility as an individual is in a stronger position to also be more socially responsible. Finally, they point out that in taking responsibility for one's thoughts and actions, one also assumes responsibility for the consequences of those actions because whatever learning outcomes may occur, it may not be readily apparent. If learners are to become independent, lifelong learners, they must learn to take full responsibility for their learning (Angelo & Cross, 1993), and view problems as challenges rather than obstacles (Gugliemino & Guglielmino, 2004).

Nevertheless, Conner with others (1996) argued that people will not learn until they are ready and motivated to learn; often this requires helping them overcome inhibitions, behaviors, and beliefs about learning. Houle (1961) elaborated on this point earlier and stated that the desire to learn, like every other human characteristic, is not shared equally by everyone. Most people possess it "only fitfully and in modest measure" (p. 1). In spite of this, becoming a self-directed learner entails that educators devise a workable plan for themselves and carry it through to completion. Houle (1984) advised that if learners' needs are not encompassed in some packaged plan, they must move into an area wholly unknown to themselves and discover how to mark out a feasible pattern of work, identify and refine their goals, locate the proper learning materials, put them in the appropriate order, carry through or improve their original plan, and make some assessment of how much they have accomplished by such efforts. These tasks are not easy, as Houle (1984) cautioned, "in the arts of self-evaluation, most professionals are amateurs" (p. 212).

The role of ongoing learning for public school educators has clearly changed due to technology advancements, and the information age has changed the scope of professional development opportunities. Yet, in the past, most public school educators had the luxury of

assuming that most professional development responsibilities belonged to someone else (Sparks & Hirsh, 1997). While it is reasonable to help educators of today assume some responsibility and take initiative for their professional development, human nature and a resistance to change is one reason, according to Goldman (2001), that some educators use the adage, "If it isn't broken, don't fix it." From another perspective, Long (n.d.) stated that:

> Self-directed learners develop by a continuing process. It is unreasonable to expect people who have matured in an environment that challenged their personal integrity, that spoon fed them with information, and one that required conforming thought, to become instantaneous self-directed learners.

Section Summary

The review of literature on adult learning has produced several major propositions that are important to this study:

- Adult learners are in need of adult learning opportunities consistent with their professions or jobs.

- Many experts in adult learning (National Research and Development Centre for Adult Literacy and Numeracy in the United Kingdom, 2003; Driscoll, 1998, 2002; Caffarella, 1994, 2002; Caffarella & Merriam, 2000; Imel, 1988; Guskey, 1995, 2000; Knowles, 1975, 1990; Korthagen, 2001; Merriam & Brockett, 1997; Verduin & Clark, 1991; Moore & Kearsley, 1996) have pointed out adult also need to be lifelong learners because:
    - Adult learners are most ready to learn when the learning is related to roles and responsibilities of their lives.

- Today's work environments are information-based linked by communications technology, suggesting the necessity for people to become continuous learners.
- Adults are continuous learners and can and do want to learn, regardless of age, and throughout their busy lives prefer to plan their own ongoing learning activities themselves.

- Knowles and others have argued that adult learners are capable of self-direction, able to plan and organize their own learning, and are or can be proactive learners. Further, they prefer to manage their own learning.

- Experts in adult education (e.g., Korthagen, 2001; St. Clair, 2002; Pattison, 2001; Hodgson & Kambouri, 1999; Miller & Boud, 1996), have theorized that adult learners have a readiness and orientation to learn related to the roles and responsibilities of adult life, and are internally motivated. These learning experiences are influenced by past experiences of the learner and current context.

- Houle (1961) identified through his research three groups of adult learners: Goal-oriented, activity-oriented, and learning-oriented.

- Merriam & Caffarella (1999), Candy (1991), Merriam and Brockett (1997), and Usher, Bryant, and Johnston (2002) have suggested that self-directed learning

occurs most often in learners' natural settings and is initiated and carried through primarily by the learners themselves.

- Several authorities in adult learning (Brookfield, 1986; Driscoll, 1998; Merriam & Brockett, 1997) have suggested that adults are motivated to learn as a response to problems or when they want to make changes in their work life, and learning can take place in any setting.

- Conner and others (1996) argued that people will not learn until they are ready and motivated to learn, and Houle (1984) suggested that if learners' needs are not encompassed in some packaged plan, they must move into an area wholly unknown to themselves and discover how to learn.

Public School Educators and Professional Development

Teaching in the 21st Century has increased in complexity because today's responsibilities for skills, knowledge, curriculum, outreach and governance of the profession have led to reconceptualizing of teacher professional development (Abdal-Haqq, 1996). There are many views about teacher professional development. Duke and Stiggins (1990, pp. 117-118) asserted there are at least three "justifications" for professional development. First, many educators appear to desire it. Second, it has become tied to teacher evaluation and also to teachers' contractual obligations. Finally, educators, like other professions, need to stay abreast of new developments.

Schlechty and Whitfords (as cited in Bredeson & Scribner, 2000) view professional development as three activities that can be classified as functions: (1) an establishment function

(e.g., increasing awareness) when the purpose is to promote organizations' change through the implementation of programs, technologies, or procedures in schools and school districts; (2) an enhancement function (e.g., apply to and improve practice) to improve teacher effectiveness; or (3) a maintenance function (e.g., continued practice) to ensure compliance with administrative and organizational goals and objectives. Hassel (1999) stressed that professional development should be viewed as a process rather than as a project or an event. Policy makers generally use the term professional development, but often this translates into periodic staff workshops.

Guskey (2000) made the point that educators traditionally have had three fairly narrow views of professional development including: 1) special events that are restricted to 3 or 4 days during the school year, 2) graduate courses to either attain an advanced degree or simply to move ahead on the district salary scale, and 3) policies that require educators and school administrators to accumulate a certain number of professional development hours or credits each year in order to retain their jobs and professional certification. Some view professional development as "merely something that can be added or deleted at the whim of administrators or school board members faced with tough budget decisions" (Katzenmeyer & Moller, 2001, p. 38).

However one views professional development, the term "staff development" is still the term most often used, and often what educators appear to use to describe the continuing education of their profession (National Staff Development Council, n.d.). The literature, in fact, uses various terms interchangeably to describe the concept of professional development, such as in-service training or education, human resource development, professional growth, or staff development, among others. Whatever the term used, professional development implies that knowledge acquired will be used in some fashion at a later time.

Participation in Professional Development

Researchers (Ogle, Branch, Canada, Christmas, Clement, Fillion, Goddard, Loudat, Purwin, Rogers, Schmitt, & Vinson, 2002; Holloway, 2003) suggest that if educators in elementary and secondary schools participate in more than 8 hours of professional development activity per year, they are more likely to utilize technologies than educators who participate 1-8 hours. However, those researchers indicated that most educators participate in such activity only 1-8 hours. McRobbie (2000) pointed out that well over half of American school educators get less than a day's worth of professional development annually on a combination of learning topics in contrast with educators in many other countries who work on professional development for 10-20 hours a week. In Germany, France, Luxembourg, Taiwan, Switzerland, and Japan, for example, educators have time in each day or week when they do not work with children but, instead, plan curriculum and lessons and evaluate one another's teaching, as a form of continuous professional growth and development.

Teacher Staff Training and Professional Development Defined

This study makes a clear distinction between the terms *staff training* and *professional development*. *Staff training* is defined as an organized group function and is predominately delivery of informational updates, through in-service, group-awareness, or workshop sessions. *Professional development* is defined as a personal approach to improving oneself through a variety of learning opportunities in order to enhance the practice of one's teaching.

Professional development is an individualized learning activity which focuses on the educator's career-long growth from pre-service education throughout the span of his/her career. While workshops may be one component of an educator's overall professional development plan, professional development "is not about workshops and courses; rather, it is, at its heart, the

development of habits of learning that are far more likely to be powerful if they present themselves day after day" (Fullen, 1991, p. 253). This definition suggests the importance of developing good habits of purposeful learning. For educators who wish to become highly competent, the processes and activities of professional development must be designed as opportunities to expand their knowledge, skills, and attitudes throughout their careers and to seek out answers from a variety of resources (Gusky, 2000; Orlich, 1989; Bredeson & Scribner, 2000; Katzenmeyer & Moller, 2001; Fullen, 1991). Learning opportunities for enhancing one's professional growth may include formal and informal learning, graduate coursework, individualized learning, reading scholarly journals, attending conferences, participating in continuing education, and creating purposeful self-learning opportunities.

Professional Development Models of Delivery

Delivery of professional development takes on many forms (Bray, 2001), making the search for a single model for professional development elusive at best. We do not yet have a unifying single model for a delivery system of professional development (Cervero, 2001).

Nevertheless, seven major models for delivery of professional development currently utilized in educational settings can be summarized. They are divided between two main categories including Formal and Informal (The literature is robust with discussion on professional development and training. Therefore, the following discussion includes seven professional development delivery models and is adopted and synthesized from Grant, 1996; Little, 1993; Cervero, 2001; Malarkey, 2003; Sparks & Loucks-Horsley, 1989; Sparks & Hirsh, 1997; Guskey, 2000; Loucks-Horsley, Hewson, Love, & Stile, as cited in Lee, 2001; Newmann & King, 2001; Hiemstra, 1994).

Formal models for delivery of professional development include the Workshop / Training model. This form of delivery has been dominant for many years. Activities related to Workshop / Training are often held after school or on Saturdays.

The other category, Informal, includes six formats for delivery of professional development including, 1) Coach / Mentor, 2) Observation, 3) Learning Communities / Teacher Networking, 4) Inquiry / Action Research, 5) Partnerships with Universities or Businesses, and 6) Individually Guided Activities / Personal Growth Plan. The reasons these six differ from formal or traditional workshops is because activities often take place during the regular school day, either as a process embedded in classroom instruction or as activities during regularly scheduled teacher planning time.

The several models of professional development delivery within the two categories as explained below, drawing upon the descriptions and explanations of the authors noted above.

Formal Delivery of Professional Development: Workshop / Training

An assumption that undergirds training is that there are behaviors and techniques that are worthy of replication by teachers in the classroom. The conventional form of delivery of professional development is "training" involving workshops, lectures, and other types of in-service activities. Unfortunately, previous decades of poor utilization of this dominant form of delivery have produced narrow conceptions associated with staff development. Today, the historical tradition of relying on outside experts as trainers lecturing large groups of professionals is still too often what one envisions about professional development, thus in the minds of many educators, training is viewed as synonymous with staff development.

The previously noted authors indicated three particularly problematic areas inherent in conventional training delivery. First, conventional professional development has failed to

improve teaching when organized as time-based requirements, such as continuing education units (CEUs). When educators view their task as meeting these time-based mandates, they tend to think of professional development as separate from the ongoing day-to-day tasks and in terms of "How can I get in my hours?" Viewing professional development activities in this manner encourages teachers and administrators to view their involvement as merely something they must endure and get out of the way.

Second, conventional staff development is still utilized as an end. Staff development is too often thrown together as a beginning of school year "wish list" of various topics put together by a panel; the final list of selected topics planned usually pleases some and frustrates others. All too often, topics end up as pre-prepared "sit and get" sessions with educators being recipients of information and generic instructional skills. Topics may become shallow in nature. The result is shallow, fragmented, and passive learning experiences.

A final problem in conventional professional development involves district mandated activities from which topics are often devoted mainly to updating practitioners about the newest developments, generic information, or latest fads.

While workshop-training can serve as a useful strategy for the delivery of professional development, it also can hinder genuine learning opportunities, if solely or overly utilized, and will produce little lasting change in the classroom. Learning opportunities provided through conventional delivery tend to reinforce the notion of professional development as a series of unrelated, short-term workshops, lectures, and presentations. This form of delivery also promotes the practice of teacher gatherings for addressing technical skills of teachers, such as mechanical use of applications, e.g., how to connect with the Internet. When mandated, this approach can stifle teachers' desire to shape their own learning opportunities and it does little to further teachers' individual professional growth.

Informal Delivery of Professional Development

The first two informal delivery mechanisms including coach-mentor and observation overlap somewhat, but the coach-mentor strategy has been traditionally used to assist new teachers. More experienced teachers often serve as facilitators to new teachers. Often, observation is a component built into a coaching and mentoring strategy that builds primarily on collaboration between or among teachers.

While observation utilizes modeling of good practice, it can be difficult for teachers to advance from observation to practice, particularly for beginning teachers, without experimentation, classroom-based modeling, and other follow-up support. Observation may also include informal discussions where teachers work together to explore new or improved ways of teaching and learning, and may include follow-up sessions.

A third strategy, learning communities/teacher networking, involves teachers talking with other educators within and between schools in order to gather new ideas and strategies from each other. Professional development utilized in this way creates social communities, and schools promoting this delivery of professional development are attempting to foster a collaborative-constructionist-philosophy.

A fourth strategy, inquiry/action research, can take different forms such as when a teacher wonders if an alteration in the lesson plan will produce improved student understanding. The inquiry may be a solitary activity or a group of teachers gathering in order to examine the different techniques. Teachers may become researchers and formulate a research question, and carry out an inquiry related to the question through writing, reflection, reading of journals and other scholarly material.

Fifth, partnerships between schools and outside organizations such as universities, research and development organizations, and businesses is a strategy used so that outside experts

in their respective fields can bring latest information directly to educators. Partnerships are based on an understanding that each group can contribute to and learn from its collaborating institution. Professional development is often a centerpiece of those partnerships.

Finally, the individually guided activities / personal growth plan, is based on the view that educators become self-directed learners and determine their own individual professional development goals, and then select the activities that they believe will result in the achievement of those goals. The individually guided activities and personal growth model is intended to foster personal and professional growth and is based on five assumptions: 1) the teacher is able to diagnose his/her own needs and/or interests more accurately than can be done by others; 2) the teacher is capable of self-direction and self-initiated learning; 3) the teacher is capable of designing his/her own learning activities and experiences that will enable him/her to achieve his/her objectives; 4) the teacher is capable of self-assessment to determine if the learning meets the identified need or interest; and 5) the teacher is more motivated to learn when he/she has ownership of the process and to initiate and plan his/her own goals.

Sometimes rather than looked as a steps or assumptions that may be followed, learning also occurs informally and almost unconsciously. More often, however, they are part of a formal, structured professional development process. When teachers have autonomy they take on a more self-directed role; they become an active participant in planning, construction, and implementation of their own new knowledge and skills. As an adult learning process, self directed development is a goal-based approach to professional growth and improvement in which teachers have access to a variety of resources for meeting their identified needs. When professional development strategies are employed, teachers control their own learning and personal growth and allow the problem, not the method, to guide their development. This approach brings personal satisfaction.

Critics (as pointed out by Cohen & Loewenberg Ball, 1999; Lieberman and Wood, 2001; Sparks & Hirsh, 2000) view individually guided activities as self-serving and even question the quality of this delivery of professional development. Defenders are quick to point out: a) other forms of school-controlled delivery continue to treat teachers as empty vessels to be filled with new knowledge by others; b) it is a strategy that promotes high-quality learning through various choices teachers make; c) teachers who either play little role or have no role at all in their professional growth will shut the door to further learning; and d) teachers are adult learners who have diverse learning styles (Korthagen, 2001; Lieberman & Wood, 2002; Newmann & King, 2001; Garet, Porter, Desimone, Birman & Yoon, 2001; Whitlock, 2003).

The following two contrasting studies, one in New York and the other in Texas, demonstrate the diametrical positions that American school systems can have when considering the individually guided activities / personal growth plan for delivery of professional development. In the first study by Sullivan, Shulman, and Glanz (2002), teachers in seven schools in New York City were offered an opportunity to take a personal role in determining their own professional growth plans in collaboration with the school supervisor. The researchers sought to determine from a survey the extent of implementation of this professional development delivery mode. However, the researchers found that administrators and teachers alike resented the individually guided activities / personal growth plan as a delivery mode. Six of the seven school principals would not support the extra effort it took to work with teachers to develop personalized professional growth plans. Those researchers found through additional feedback from teachers that many of them were fearful of consequences from their principals if they selected the option of developing their own professional growth plan, teachers indicated that they were urged not to select the professional growth option, and that teachers felt that developing

professional growth plans was too much work. Those educators and principals refused to turn from conventional inservice training mode of professional development.

In the second study, reported by McCullen (2002), when offered this mode of professional development, educators in Lubbock, Texas readily subscribed to individual guided activities for ongoing professional growth. Those teachers welcomed the opportunity to self-select what they want and need, and when they want to learn it. By implementing this delivery mode, teachers could learn at home, at school, or from commercial instructors, at times conveniently included in their busy schedules. They could select universities, special programs, district classes, learning delivered online, or even the independent reading of a computer manual. In Lubbock, it was found that these individually guided activities for professional growth appeared to be highly successful, with 97 percent of those teachers desiring and utilizing this form of delivery of professional development.

Emerging Approaches to Professional Development Delivery

While schools may be juggling multiple approaches to try to figure out what works for them (Jones, 1998), three new approaches and environments for professional development delivery are appearing through use of the Internet. They include delivery of professional development via online/web-based, e-mail, and virtual conferencing. These three modes could become additional resources for the individually guided activities model.

Using online/web-based delivery gives school systems the opportunity to delivery customized pre-packaged professional development topics/programs, through the Web. These programs have an understandable appeal; they are readily defended, managed, and evaluated (Little, 1993). Teachers who have online access can choose from a wide selection of specific professional development topics on an as-needed or on-demand basis from school or home.

Hawley and Valli (2000, 2001) suggested that web-based mode of delivery encourages professional development activity at the personal level, promoting personal satisfaction and professional growth. They offered several reasons including: Web-based delivery is flexible and offers self-paced learning opportunities of choice and individualization; it provides a format for self-analysis and personal reflection; and it allows thoughtful decision making. Thus, providing e-learning, distance delivery of media designed as self-paced professional development learning topics material is one strategy for incorporating into the individually guided activities model.

A second format, e-mail, is derived from the coach/mentoring approach. This form of delivery provides a "safe" environment for participants (Sabieh, 2002). Many new teachers do not wish to be mentored by another teacher within the same department and/or school. By using e-mail the new teacher is provided a safe-haven with a mentor teacher from another location. Various collaborative projects can also be carried out by e-mail. Nabors (1999) pointed out that e-mail is now becoming widely popular as means of immediate feedback between student teachers and their college supervisors.

Finally, virtual conference/online forums, also called e-conferencing, characteristics of this model include an online meeting, where interaction may be synchronous or asynchronous. Teachers can meet anytime or anyplace at a designated time and place (Anderson, 1996; Anderson & Kanuka , 1997).

Section Summary

The review of literature on professional development for teachers contributes several concepts and research findings pertinent to the current study:

- Experts in teacher education (e.g. Gusky, 2000; Katzenmeyer & Moller, 2001; Orlich, 1989; Bredeson & Scribner, 2000; Fullen, 1991) have theorized that the

concept of professional development implies that new knowledge acquired should be through purposeful opportunities to expand their (educators) professional knowledge, skills, and attitudes throughout their careers and seek out answers from a variety of resources.

- As pointed out by several leading educators, (e.g., Grant, 1996; Little, 1993; Cervero, 2001; Malarkey, 2003; Sparks & Loucks-Horsley, 1989; Sparks & Hirsh, 1997; Guskey, 2000; Loucks-Horsley, Hewson, Love, & Stile, as cited in Lee, 2001; Newmann & King, 2001; Hiemstra, 1994), the individually guided activities/personal growth model is intended to foster personal and professional growth and is based on five assumptions: 1) the teacher is able to diagnose his/her own needs and/or interests more accurately than can be done by others 2) the teacher is capable of self-direction and self-initiated learning, 3) the teacher is capable of designing his/her own learning activities and experiences that will enable him/her to achieve his/her objectives, 4) the teacher is capable of self-assessment as to whether the learning meets the identified need or interest, and 5) individuals are more motivated to learn when they have ownership of the process and initiate and plan their own goals.

- Ogle, Branch, Canada, Christmas, Clement, Fillion, Goddard, Loudat, Purwin, Rogers, Schmitt, & Vinson, 2002; Holloway, 2003) suggest that if educators participate in more than 8 hours of professional development activity per year, they are more likely to utilize technologies than educators who participate 1-8 hours. However, McRobbie (2000) pointed out that well over half of American

school educators get less than a day's worth of professional development annually that deal with to a combination of learning topics.

- Gusky, 2000; Orlich, 1989; Bredeson & Scribner, 2000; Katzenmeyer & Mollen, 2001; Fullen, 1991 suggest the processes and activities of professional development must be designed as opportunities to expand their knowledge, skills, and attitudes throughout their careers and to seek out answers from a variety of resources.

- Cervero (2001) suggests that we do not yet have a unifying single model for a delivery system of professional development system.

- Many writers and researchers agree on a conceptual framework on professional development. Framework suggests two categories: formal and informal. The formal category includes the workshop/training model and the informal category includes six models (coach/mentor, observation, learning communities, inquiry, partnerships with universities or businesses, individually guided activities/personal growth plan). The writers and researchers suggest that formal workshops can stifle, while the individually guided/personal growth model allows teachers take on a more self-directed role in its planning, construction, and implementation.

- Critics of the individually guided model (as pointed out by Cohen & Loewenberg Ball, 1999; Lieberman and Wood, 2001; Sparks & Hirsh, 2000)

view individually guided activities as self-serving and question the quality of this mode of delivery of professional development.

- Defenders of the individually guided model (Korthagen, 2001; Lieberman & Wood, 2002; Newmann & King, 2001; Garet, Porter, Desimone, Birman & Yoon, 2001; Whitlock, 2003) are quick to point out: a) other forms of school-controlled delivery continue to treat teachers as empty vessels to be filled with new knowledge by others; b) it is a strategy that promotes high-quality learning through various choices teachers make; c) teachers who either play little role or have no role at all in their professional growth will shut the door to further learning; and d) teachers are adult learners who have diverse learning styles.

- In a study by Sullivan, Shulman, and Glanz (2002), teachers in New York City were offered the opportunity to implement the individually guided model, but those principals and teachers would not support the extra effort it took to follow through with the individualized professional growth plan.
- McCullen (2002) reported a study that found that educators in Lubbock, Texas welcomed the opportunity to participate in individually guided professional development opportunities including opportunities to learn at home, at school, through web-based resources, and they enjoy learning at times convenient for them.

Educators' Use of Technology

Though many educators view educational technology as synonymous with computers, this technology may include computers, VCRs, televisions, telephones, video and still camera, audio-devices, calculators and other hand-held devices, microcomputer-based lab equipment, videodiscs, CD-ROM, satellites, multimedia, and telecommunications networks (U.S. Congress, Office of Technology Assessment [OTA], 1995).

Technology continues to evolve, and includes two components: a product– the tool that embodies the technology– and a process– the information base of the technology (Peck & Dorricott, 1994). Together, the two components can be integrated with ongoing professional development. Technology should not be looked upon for what it is, but for what it can do (Dowling & Harland, 2001), and technological change must be regarded not as *revolutionary* process but as an *evolutionary* one (Carter,1968; Zhao, Pugh, Sheldon, & Byers, 2002).

Yet, Cuban (1986) argued that new technologies are unlikely to transform educational practice. The relationship between educators and technology can be looked at from the perspectives of potential barriers in teacher use of computer technology, teacher uses of computer technology for professional development, and teacher general use including stages of learning the computer educators may go through in their skills and competence of computer technology.

Potential Barriers in Teacher Use of Technology

The literature suggests a link between the degree to which teachers personally perceive computer technology and the manner in which technology is used. The literature suggests the link is often in the form of barriers to educators' use of technology. Stein, McRobbie, and Ginns, (2002) suggested that old habits and attitudes in veteran teachers do not fade easily. The authors

believe missed opportunities by teachers to become users of technology are influenced overall by their prior beliefs and experiences about learning and teaching. McKenzie (1991) noted that old mindsets become gridlocked into old patterns and perceptions, and teachers need to embrace technological changes. For those teachers who view themselves as pioneers, inventors, and discoverers as users of new technology, McKenzie said, these "teachers need to be nurtured so that when the waves of the future hit the shores of our present our teachers will dive headlong through them rather than ducking, running for shore or allowing themselves to be swept away."

Researchers from the Institute for the Advancement of Research in Education [IARE] (McGraw, Ross, Blair, Hambrick, & Bradley, 2000) surveyed a random sample of K-12 public school teachers relating to their use of technology in Kentucky, Tennessee, Virginia, and West Virginia. That study discovered three barriers relating to teachers learning technology and software: teacher beliefs about technology, established classroom practices, and resistance to change. Sugar (2002) noted that teachers' fundamental beliefs toward technology are more difficult to modify, and this can be a critical barrier in effective technology adoption.

Sugar (2002) discussed several barriers of educator usage of technology. First, educators often fall into the blame syndrome, from which they usually blame themselves if they cannot successfully operate a particular technology. Sugar argued, however, that teachers should not blame themselves if problems occur while they use technology. If, for example, a user cannot navigate properly through a particular technology, e.g., if a teacher is attempting to use the Web and pushes a wrong button or clicked the wrong icon, then part (if not all) of the responsibility lies with the designer– not the teacher; the designer did not originally anticipate how users would use the particular technology. Second, Sugar suggested that technology should conform to teachers' needs, as opposed to having teachers' needs conforming to technology. Finally, Sugar suggested that educators should use the particular technologies for appropriate reasons,

otherwise, it is a waste of time. Good use of time spent on technology should be designed to help teachers be more creative, allow teachers to become problem solvers, and designing of the technology should foster teachers to become engaged in the technology.

Wood's (2000) case-study of primary schoolteachers who were pioneers in their use of innovative technologies contained an unexpected finding in the form of a barrier: sometimes teachers go underground to avoid being criticized for "showing off"or looked at as a braggart from other teachers. Wood determined that drawing too much attention to oneself can become a barrier to a teacher's productive computer usage. It appeared that if colleagues perceive a teacher as showing off it may invite a hostile response from those other teachers. Wood contributes this observation to a growing uneasiness among traditional teachers that their hard-won teaching style is rapidly becoming obsolete– and so are they.

Teacher Uses of Technology for Professional Development

Lemke and Coughlin, (1998) stated that many excellent teachers view the use of technology as inefficient or unpleasant simply because they do not have basic skills of usage and trouble-shooting. If teachers are not effective users of technology, it is unlikely that they will establish a comfort level necessary for its usage.

Nevertheless, new technologies have helped create a culture for learning (Papert, 1996), and current literature supports this assertion and suggests that continuing professional development in teachers' use of technology is important and often desired by teachers. However, at Tech Conference 2000 (Means, Penuel, & Edys Quellmalz Center for Technology in Learning, 2000), educators revealed that they are still struggling to find common ground between the traditional and the new, but they acknowledge the necessity of immersing new technologies within their strategies for ongoing teacher learning.

Today, technology has become part of most educators' daily life in one form or another. Computer technology is taking on new perspectives in relation to its potential use and strategy for delivery of professional development. Technology can provide a means of offering new forms of professional development (Grant, 1996), not just because of what teachers learn from them but also because of their effects on teachers' self-esteem and morale (Singh & Means, 1994).

Educators' professional development strategies do not have to include computers or even formal classroom learning, but adding computer technology to the mix can enable teachers to access the technology as a complement to delivery of their traditional learning techniques (Ariza, Knee, & Ridge, 2000). Traditionally, computer technology in the form of teacher training has focused on the basics such as connecting to the Internet or employing computers for e-mail. Grant (1996) had argued that professional development for technology needs to get beyond those strategies, and must utilize the technology as an empowering tool for teachers. Grant (1996) gives a working conception of what it is that teachers need from a professional development program to support technology use:

> The use of technology as a tool within professional development can help teachers become more productive professionals, and empower teachers to make sense of how mastery of technologies can be useful to them in their teaching and as a tool for professional growth. What teachers learn about technology should be personally valuable for the things they need to do.

One study by Cisco Systems (2004) found that teachers with access to computers in the classroom and/or at home are most likely to use the technology for teacher work. They tend to use technology to create lesson plans, communicate with the community and each other, and conduct research.

Another national study, conducted by researchers Smerdon, Cronen, Lanahan, Anderson, Iannotti, and Angeles (2000), focused on how computer technology is being incorporated into professional development. Results reported that teachers learn technological skills on their own

(93%), through professional development courses (88%), and their colleagues (87%). Additionally, the study suggested that more consistent, formal training may help more teachers feel better prepared to use computers and the Internet, as only 23 percent of those teachers feel well-prepared.

A study by Michigan researchers (Zhao, Byers, Mishra, Topper, Chen, Enfield, Ferdig, Frank, Pugh, & Tan, 2001) found that most teachers have used and are planning to use a number of different technologies to support their professional development. That study found word processing software was the most used technology, followed by e-mail, downloadable files from the Internet, and multimedia reference materials. The study also found the sample participants did not agree that such statements including "computer technology can't help me learn new skills," and "little or not use to me as a teacher," represent their attitudes or beliefs.

Alston and Miller (2001) conducted a study to identify infusion of technology in North Carolina and Virginia secondary agricultural education curricula. Findings indicated that respondents from both states agreed teachers will have access to lesson plans via the Internet, but the respondents took a neutral stance towards the future of technology in their respective programs. Respondents also perceived that technology can: 1) offer an increase in the availability of educational opportunities, 2) offer improved informational resources for faculty 3) offer more effective instructional materials, and 4) offer more convenient delivery methods.

Research is still coping with finding a proven model for technology use in public schools. Coley (as cited in Smith, 2001) pointed out that more than a dozen meta-analyses involving more than 500 studies have been conducted to answer the questions surrounding school and teacher use of technology. Yet, no one model has emerged as the most effective way to successfully integrate technology for teacher learning.

Teacher Uses of Technology Other Than Professional Development

Ellsworth (1997) argued teachers must be willing to change old assumptions about teaching and learning. While not all teachers are adept in using computer technology, and training helps teachers transform lifeless equipment into useful tools (Office of Postsecondary Education, 2000), teachers are often reluctant to reveal their lack of computer skills (MacMillan, Liu, & Timmons, 1997). Van Horn (2002) suggested that learning how to use computers and the Internet creates a technology penalty for the teacher– the cost in time and sometimes even money that a teacher pays in order to incorporate technology. Even what initially appears to be a simple technological project or activity can quickly become overwhelming in time required for using the technology. Czapla (2002) argued that teachers need extensive training, not only to learn computer fundamentals and how to integrate these tools into instruction and professional development purposes, but also to survive daily management using the computers.

Trotter (1999) pointed out that one misconception is that newer teachers are more likely to use education technology than their veteran peers simply because they grew up with computers. A national survey by Education Market Research (2000) revealed that teachers who have been teaching for more than 20 years are just as likely to use digital content as those who have been teaching for five or fewer years.

Ertmer, Conklin, Lewandowski, Osika, Selo, and Wignall (2003) also noted that research indicates newer teachers do not use computers significantly more than their more experienced colleagues. Those researchers surmise that new and younger teachers entering the classrooms have at least basic computer skills and knowledge, yet they have little idea on how to utilize the technology for professional development purposes such as research or as a vehicle for ongoing professional growth.

Mathews and Guarino (2000), while looking for a model to predict teacher computer use in southeastern Idaho, found that teachers with more years of teaching experience report significantly lower levels on computer literacy and computer ability, yet this same group reported significantly higher levels of use. Thus, the teachers who use computers the most report the poorest computer skills.

A national study conducted by Lewis, Parsad, Carey, Bartfai, Farris, and Smerdon (2000) included elementary, middle, and high schools in the 50 states and the District of Columbia found that 78 percent of teachers reported having participated in the last 12 months in professional development opportunities for advancing their technological skills. However, results indicated that new teachers, with three or fewer years of teaching experience, were slightly less likely to participate in use of technology than those teachers with four or more years of experience.

During the 2002-2003 school year, Learning Quest (Moersch, 2003) conducted a national Level of Technology Implementation (LoTi) survey to create a baseline on the current level of technology implementation by teachers throughout the nation. That study revealed that not one teacher indicated that computers provide a seamless and almost transparent medium for information queries, problem-solving, and/or product development, but that 19 percent of teachers surveyed use classroom computers primarily for teacher productivity (e.g., e-mail, word processing, grading programs). Lieberman (as cited in Rand Report, 1995) urged against adopting technology primarily for teacher productivity. Instead, any new technologies should create time for teachers and cut down on the incredible amount of "administrivia."

Stages of Instructional Evolution

Apple Classroom of Tomorrow [ACOT] (2003) researchers indicate that there are four or five levels of sophistication or stages educators seem to move through for teaching and learning technology, called "instructional evolution." These stages include: entry, adoption, adaptation, appropriation, and invention. Apple Classrooms of Tomorrow, through its ACOT Project, began as a research and development collaboration among public schools, universities, research agencies, and Apple Computer, Inc. Initiated in 1985, ACOT began its work in seven classrooms that represented a cross section of America's elementary and secondary schools. Its goal was to study how the routine use of technology by teachers and students might change teaching and learning. The ACOT research project concluded in 1998. After more than a decade of research, the ACOT project was one of the longest continuing educational studies of its kind.

Even earlier then ACOT began, Plato Learning Inc. (Foshay, 2000), viewed as the original educational software company, is well-known for its development of software for Adult Basic Education (ABE), General Educational Development (GED), and English as a Second Language (ESL). Plato software and training dates back to1963, and Plato Learning has since implemented its learning products in over 5,000 sites (K-14). Plato provides delivery of professional development, through customized training to meet school needs district or state standards.

The following Stages of Instructional Evolution are adapted and synthesized primarily from Apple Classrooms of Tomorrow [ACOT] research (1995, 2003) and the works of that of Plato Learning, Inc. (Foshay, 2000). (However, literature supportive of these stages includes: Ringstaff, Haymore Sandholtz, & Dwyer, 1991, 1997; Lemke & Coughlin, 1998; Grant, 1996; Nuthall, 2002; Poplin, 2001; McKenzie, 1991; and Mehlinger & Powers, 2002.)

The stages of instructional evolution include:

Entry:
[Struggling With the New Technology / Survivor Skills]. Teacher learns the basics of using the new technology and the Internet. Teacher may use an online service or software occasionally, but little in-depth attention is paid to specific educational objectives or the impact of its use. Begins to break new ground about the innovation, overcome some degree of anxiety, and promote teacher change in attitude and perspective takes place.

Adoption:
[Supplementary Use]. Learner comfort rather than grandiose expectations. Begins to blend technology into classroom practices and application that supports the existing curriculum standards and focuses less on the technology itself. Teacher begins to appreciate practical use of the technology and can acknowledge it is not merely an expensive alternative to workbooks, overhead projectors, ditto sheets, encyclopedias and board games.

Adaptation:
[Transition To A Teacher Tool] Teacher integrates new technology into greater productivity of classroom practice, such as classroom management, advance to computer drill-and-practice instead of book reading, use of word processor, spread-sheets, graphics tools instead of paper/pencil. Teacher begins to see real benefits of technology in variety of areas.

Appropriation:
[Transition to Complementary Use] Teacher focuses on cooperative, project-based and interdisciplinary work– incorporating the technology as needed and as one of many tools. Teacher begins to use the technology effortlessly in own work and in the classroom and initiates new challenges. Will begin to have difficulty imagining how he/she would function without it. Begins use of research on the Internet, simulations of real-world problems; e-mail, chat, multimedia from CD-ROM, collaborates with teachers in other classrooms in other parts of the state, nation, or world.

Invention:
[Primary Use / Full Integration]. Teacher discovers new uses for technology tools - combines multiple technologies. Significant changes occur in classroom and professional life through sense of gratification and accomplishment. Teacher reflects on teaching and questions old patterns and sees technology as an empowering tool. The teacher now uses the technology to fundamentally change his/her role and the structure of their classroom. The technology is now part of the teacher's ongoing professional development strategy, often will replace large-group activities such as inservice lecture or workshop with highly individualized, self-paced study in self-selected topic. Teacher adapts to other emerging technologies. Viewed by peers as a role model and becomes mentor for other teachers.

The proliferation of computers and Internet access in American classrooms today may convey that the technology is being harnessed by teachers. However, the various stages of technology adoption described above suggest four things:

1) Throughout the learning process, different professional development activities emerge at different points in time, and not necessarily in the logical order listed above.

2) The process extends over time, perhaps several years, for educators to make effective use of technology.

3) Teachers need different types of professional development at different levels of sophistication.

4) Adequate, timely, and continuous professional development is key to effective technology implementation.

Also, teachers can use technology as an effective lever for meaningful change in their roles in the classroom. Technology can support and strengthen the very core of the teaching and learning experience, or it can be relegated to a role which is peripheral at best, and a distraction at worst (Foshay, 2000). Wilson's (2003) findings regarding Tennessee's educators suggested that the use of technology to enhance learning is present, but that there appears to be an inability of a large percentage of Tennessee teachers to make practical use the available equipment.

Hance (2001) pointed out results from a national study showing that more than one-quarter of elementary schools nation-wide indicated that the majority of their teachers possess only the most basic beginner skills, yet only 11percent of teachers put skill-based technology training at the top of the list.

Section Summary

Ideas and research findings from the review of the literature on educators' use of technology that have pertinence to this study included the following:

- Several researchers (e.g., Trotter, 1999; Education Market Research, 2000; Ertmer, Conklin, Lewandowski, Osika, Selo, & Wignall, 2003; Mathews & Guarino, 2000; and research by Lewis, Parsad, Carey, Bartfai, Farris, and

Smerdon (2000) indicate that newer teachers do not use the computer significantly more than their more experienced colleagues. They point out that one misconception is that newer teachers are more likely to use education technology than their veteran peers simply because they grew up with computers.

- Papert (1996) and others suggested that new technologies have helped create a culture for learning and that continuing professional development in teachers' use of technology is important and often desired by teachers.

- Means, Penuel, and Edys Quellmalz Center for Technology in Learning (2000) reported that educators revealed that they are yet struggling to find common ground between the traditional and the new, but they acknowledge the necessity of immersing new technologies within their strategies for ongoing teacher learning.

- Cisco Systems (2004) suggested that teachers with access to computers in the classroom and/or at home are most likely to use the technology for teacher work.

- Michigan reseachers (Zhao, Byers, Mishra, Topper, Chen, Enfield, Ferdig, Frank, Pugh, & Tan, 2001) reported that most teachers have used and are planning to use a number of different technologies to support their professional development and found that including word processing software was the most used technology, followed by e-mail, and downloadable files from the Internet and multimedia reference materials.

- Several writers have identified barriers to teachers' use of technology. Those barriers include:
  - prior beliefs and experiences about established classroom practices, and teachers become gridlocked when learning new technologies, thus a resistance to change (McKenzie, 1991; McGraw, Ross, Blair, Hambrick, & Bradley, 2000),
  - educators do not have basic skills of usage (Lemke & Coughlin, 1998; Hance, 2001),
  - educators blame themselves when technology does not perform as expected and avoid its usage (Sugar, 2002),
  - educators who are advanced users of technology fear being criticized as "showing off" by other educators who are less adept (Wood, 2000),
  - lack of teacher training to integrate technology as a learning tool (Ellsworth, 1997; Office of Postsecondary Education, 2000; MacMillan, Liu, & Timmons, 1997; Van Horn, 2002; Czapla, 2002; Hance, 2001),

- Researchers from the Apple Classroom of Tomorrow [ACOT] project, 2003, and Foshay, 2000 indicated five various stages that educators appear to move through when learning technology including Entry, Adoption, Adaptation, Appropriation, and Invention. At the Invention stage, computer technology becomes educators' primary tool for ongoing professional development. Educators often desire to replace inservice or workshops with individualized, self-paced study in self-selected topics through computer technology.

Media Resources For Delivery of Professional Development

John Chambers, Cisco Systems president and CEO, commented at a computer trade show (COMDEX) conference that "education over the Internet is going to be so big that it is going to make e-mail look like a rounding error" (Friedman, 1999). While this statement may seem an overly optimistic prediction (Tech Tips, 2000), technology has brought a windfall of media channels for delivery of teacher professional development.

Delivery of web-based, CD-ROM, and PDF documents as digital learning modules for professional development do not replace traditional media but generally are added to those earlier media, and they increase the existing possibilities, with only the intensity of use varying from time to time (Peter, 2002; Jochems, van Merriënboer, & Koper, 2004). In some instances, digital learning modules can replace some of the most expensive or least effective segments of those traditional methods (Fankhauser & Lopaczuk, 1996).

Web-based, CD-ROM and PDF document delivery of professional development are not simply an artificial method to get supplemental material to teachers. Today's technologies enable creation of media with a variety of new attributes. These media are capable of being fully self-contained learning modules, with direct applicability to ongoing work in particular, which cannot be denied (Vermeire, Carbonez, Darius, & Fresen, 2002).

These media are becoming increasingly important as learning tools for just-in-time learning, making learning convenient in confidential settings, addressing different learning styles and needs, and complimenting a common distance education learning environment that is becoming a mainstream delivery format, suitable for many different types of learning activities (McGreal, 1997; Dwyer & Li, 2000; National Staff Development Council, 2001; Bertrand-Hines, 2000; Duhaney, 2000; Treacy, Kleiman, & Peterson, 2002; CEO Forum on Education and Technology, 2000).

Delivery of instruction using Web, CD-ROM, and PDF documents (as downloadable files from the Internet) can be loosely defined as any presentation using words and pictures delivered through computer-based technologies or digital tools, such as hypertext, hypermedia or text files. The presentation integrates as some, but not necessarily all, of the following: printed or spoken text, pictures, including static graphics, animation or video, and sound (Mayer, 2001; Johnson, 2000; Barron & Orwig, 1995). It can also be defined as all means of communication, whatever their format (Reeves, 1998).

People generally associate the terms "hypertext"and "hypermedia" solely with "online" or "web-based" instruction delivered via the Internet, but it is important to note that instructional technologists and media designers also include the CD-ROM in their definitions of "online" or "web-based" (Killion, 2000; Driscoll, 1998). While both, CD-ROM and the Web, provide a similar interface to the user based on browsing interactions, the principal difference is that standard CD-ROM must be physically compiled and once written cannot be revised, whereas web-based pages are readily revisable by the author. These differences have no intrinsic impact on the learner experience (Smedt & Black, 2002).

Hypertext

Hypertext, also called hyperlinking, or linking, is a concept. As a concept, the World Wide Web [the Web] and CD-ROM use hypertext to present static text, images, or other graphic displays which allow the user to explore or navigate related topics nonlinearly. Landow and Delany (1991) defines hypertext as the use of the computer to transcend the linear, bounded, and fixed qualities of the traditional written text. Related pieces of information linked by electronic connections, such as colored words imbedded within a passage of text, would constitute a hypertext link. Using a mouse to click on a hypertext word or graphic would result in additional

and related information appearing on the screen. This allows easy access among related pieces of information within a Web page or among Web pages.

Hypertext became important in educational computer use in the context of multimedia development during the 1980s (Collis, 2002). In essence, the nature of hypertext is that learning occurs in a democratic environment, characterized by symbolic hyperlinking– presented through text or graphics– giving life to designs by presenting information from either specific sections within the same learning environment or from material entirely outside the learning environment (Landow & Delany, 1991) .

Hypermedia/Multimedia

Like hypertext, hypermedia or multimedia is a concept. The literature uses various terms including integrated media, web-based media, instructional media, interactive media, online media, and multimedia on CD or DVD, among others to refer to hypermedia.

While media can be randomly accessed in the same manner as hypertext (through links), dynamic information from multiple forms of media such as text, an atlas, a database of still images, an encyclopedia, voice, video, slide-show, and/or animation, about particular topics can be utilized to acquire information (Dede & Palumbo, 1991; Deshler, Schumaker, & Fisher, 1996), often via a single CD-ROM disk (Collis, 2002). Developers use hypermedia as their representational structure; no other medium can support the complex knowledge architectures required. Associative formalisms such as hypermedia are one way to transform information to knowledge (Dede & Palumbo, 1991)

Dede and Palumbo (1991) point out that hypermedia's flexibility as a "representational formalism" facilitates recontextualization. The Web, for example, can be conceptualized via analysis (as a set of nodes) or synthesis (as a network of links). The combination of associativity

and nonlinearity in hypermedia adds dimensions to user thought and communication lacking in other media. Learners have the ability to navigate movement, based on the progress of discourse with the user (Bateman & Harvey, 1998; Redman, 1999; Collis, 2002; Farrell & Moore, as cited in Chen, 2002).

Distance Learning as a Resource For Educators' Professional Development

The design of modern distance education systems and structures differentiates them from earlier models of correspondence or broadcasting education. Traditionally, print has been the most common medium for distance education, in the form of study guides and other written materials, sent through the mail. Broadcasting, both radio and television, has also served as another major medium (UNESCO, 1987). Various other media have been popular for use in distance learning, including postal mail, cassettes, telephone, and satellite. Distance learning, with a long history of serving isolated and remote learners, has now emerged as an effective, mainstream method of education and training that provides learning opportunities that are flexible and responsive to learners' needs (Center for Adult Learning, 2003).

The distinction between distance education and distance learning is often blurred in the literature. Verdium and Clark (1991) point out that there are so many concepts and definitions available it is easy to be confused about what is and is not distance education, especially with emerging media. They define *distance education* as formal instruction in which a majority of the teaching function occurs while educator and learner are at a distance from one another, while *distance learning* is the use of instructional materials or media for self-instructional purposes.

Since distance learning is normally a highly individualized activity, it is an exercise in independence which covers the planning, timing, and carrying out of individual study. The individual can proceed at his/her own pace, skip ahead, or review; the individual can study at

home or work on his/her own and usually in his/her spare time. The individual can work in a risk-free environment where he/she can avoid embarrassment, track his/her own progress, and engage in practice until he/she achieves competence (Lewis, 1989; Holmberg, 1986; Center for Adult Learning, 2003; Fankhauser & Lopaczuk, 1996; Mioduser & Nachmias, 2002).

Distance learning is a resource for professional development. While traditional learning environments usually rely on instructors to select delivery mechanisms (Summers & Reck, 1998), instructional modules available through various media allow the learner to select delivery format. Delivery systems at a distance are a mix of special techniques of design, hardware, software and other technology (Moore and Kearsley, 1996) that make the learning process possible by affordable interactive communications technology (Garrison, 2000). Because hypertext and hypermedia have a built-in capacity for interaction and feedback, thereby creating an interactive learning environment, web-based, CD-ROM, and PDF documents using these formats are applicable for distance learning (Ely, 1996).

Distance Learning Models

There are generally three broad categories or models of distance learning, including 1) asynchronous, or, what Russell (2001) calls independent, 2) synchronous, and 3) distributed / hybrid. The differences are mostly in the demands made upon the learners. Asynchronous learning is unscheduled because learners do not rely upon real-time, direct communication with instructors. Modules delivered online, as professional development in this study, were designed as self-directed and self-paced learning material because there is no instructor involved. Learners access and interact with the learning material at their own convenience. Asynchronous delivery of learning opportunities utilizes the computer, printer, and a Web browser to facilitate the

learning, the learning is done at the learner's choice of place and time. The asynchronous model is one way to quickly transfer the desired knowledge into the hands of teachers.

The synchronous model also utilizes the computer, printer, and Web browser, to facilitate learning. Synchronous learning is often referred to as the virtual classroom, and may include learning in groups, meeting online at prearranged times, live chats, and videoconferencing. Because this learning format requires collaboration and communication at agreed times, there may be also greater opportunities for socialization than in an asynchronous model. However, flexibility is reduced because 24-hour access is rarely possible (Russell, 2001).

Finally, the distributed / hybrid model is usually a mix of face-to-face and online learning. Higher education faculty frequently utilize this model for formal classroom learning. Shapira and Youtie (2001) reference a study that found more than two-fifths of all formal classroom courses in higher education now assign Web pages as online learning, thereby creating distributed /hybrid learning.

The three models discussed can vary in degree of usage, however, and do not have to be present is every distance learning situation. Porter (1997) points out that the technologies used, the structure of the course, and the degree of supervision can be varied to meet a particular group's needs or interests in a distance learning course.

The Web and CD-ROM as a Conduit for Professional Development

While web-based and CD-ROM learning is not suitable for or adaptable to every situation (Driscoll, 1998; Schank, 2002), the potential of CD-ROM use is supported by most desktop computer systems, and web-based learning environments through a Web browser that can access the Internet facilitates an online learning environment (Mioduser, Nachmias, Lahav, & Oren, 2000; Collis, 2002).

Driscoll (1998) offered two indicators to determine whether or not web-based and CD-ROM learning is appropriate to a situation: 1) when there is a gap in learners' skills and knowledge and 2) when there is a need for cognitive skills. For the first indicator, a determination is made as to whether learning through the Web or CD-ROM is a potential solution to a performance problem. This approach will not work, if the performance problem is the result of factors other than lack of skill or knowledge. The second indicator, the need for cognitive skills, includes solving problems, includes such skill sets as solving problems, applying rules, and distinguishing among items. Cognitive skill development well-suited to web-based and CD-ROM learning includes using text, graphics, and symbols and cognitive strategies needed in reading, writing answers, solving computational problems, and completing exercises. An appropriate example of a cognitive strategy for a teacher would be learning how to design a student true-false test.

Driscoll (1998) pointed out that technically and theoretically just about anything can be taught on the Web and/or CD-ROM, but it can be difficult or impractical in some cases, including the teaching of psychomotor skills and attitudinal skills. Psychomotor skills require a complex combination of physical movements (e.g., learning to swing a golf club) and are difficult to learn in an online learning environment. Similarly, attitudinal skills help learners change their opinions and, in turn, change their behavior. While psychomotor and attitudinal skills are challenging in any medium, they are particularly challenging in web-based and CD-ROM learning environments.

To be effective as educators' professional development, learning modules must combine the media with activities that motivate, focus, support, and sustain teachers' participation (Wiske, Sick, & Wirsig, 2001). Pre-prepared modules allow media opportunities for teacher professional development in five main ways including:

1. Presentation of the same information simultaneously in multiple formats (web-based, CD-ROM, PDF downloadable Internet files) as customized learning modules.

2. Media as instruments of communication.

3. Delivery of pre-prepared professional development materials creating both:
   a) a self-directed learning program for teachers, as adult learners, and
   b) a self-paced learning experience that allows the teacher to maximize his/her scheduling flexibility

4. Media as instructional strategies.

5. Choice among three available delivery formats, thus, opportunities to use preferred learning style, hardware capabilities, and level of technological comfort.

While professional development modules have the potential to be of great use by teachers as a resource and for furthering their professional development in public school environments, technologically delivered professional development need to be carefully matched to teacher needs as well as state and/or federal guidelines for teacher proficiency. The initial need of a teacher to further his/her expertise through professional development may result from an identified deficiency in job performance or a desire to improve performance. In the first instance, the school principal, or a teacher mentor perhaps, will inform a teacher he/she is deficient in some aspect of performance; e.g., a lack in ability to create well-designed student tests. The teacher will then be given an opportunity to alter this deficiency through professional development. In the second situation, a teacher might simply decide that he/she wants to become more proficient in a particular performance area or that he/she wants new knowledge and skills. Availability of learning activities through carefully designed, technologically delivered, professional development modules can serve either need. A major benefit for teachers is the opportunity to gain greater competence in performing their classroom duties through learning modules, which they can access as needed in a variety of settings.

In general, while delivery of teacher professional development includes a wide variety of choices, opportunities for an individual teacher ought to be beyond a single delivery method, such as inservice workshops, and ought to include on-site and online opportunities (Goldman, 2001; Beer, 2000). The unique capability of various media innovations, including the Web, CD-ROM, and PDF documents, justifies consideration of including one or more of these approaches as delivered packaged learning opportunities for teacher professional development (Johnson, 2000; Leblanc, Saury, Seve, Durand, & Theureau, 2001; North Central Regional Educational Laboratory, 1999).

Customized learning modules designed for teacher learning become customized courseware developed for specific objectives of teacher and school system needs. Modules are cost-effective when implemented on a large scale; modules allow anytime-anywhere learning that is free of the constraint that learner and instructor must be in the same classroom. Modules are free of the constraint of time, using recyclable material, and modules are deliberate efforts to provide alternative opportunities for teachers (UNESCO, 1987; Vermeire, Carbonez, Darius, & Fresen, 2002; Bertrand-Hines, 2000; Fankhauser & Lopaczuk, 1996; Mioduser & Nachmias, 2002).

Strategic delivery of various mediated learning opportunities may introduce economies and accelerate learning. Media choices also allow for individualization of opportunities by presenting either identical information, or variations of the same information, to different learners at different times (Schure, 1968). Learning modules are well-suited for individual learners and for application of cognitive skills related to knowledge, comprehension, and application. They allow learners to engage in self-paced programs that use hyperlinking and other interactions that are under the control of the learner. Summarized below are characteristics

of engagement with professional development modules (adapted from Driscoll, 1998; Draves, 2000):

Self-direction: Learners define and self-select desired areas of learning. Learners initiate learning and actively go get it.

Self-paced: Learners create the time to engage in learning at their convenience and set own pace for completing learning modules.

Individual learning: Learners work alone to master skills.

Not traditionally structured: Learners are free to navigate from place to place within the learning module and pick and choose areas of selected interest.

Discrete units of instruction: Teacher self-selection of learning objectives makes it desirable to divide the content into lessons/modules. Learners are expected to complete discrete units of material to demonstrate mastery of the objectives.

The Web as a Delivery Mechanism

The Web is a medium that encourages brief encounters. We use phrases such as "browsing" and "surfing" to describe our experience with the Web rather than "studying" and "contemplation" (Wolfe, 2001). Learning material is provided through the Internet, used as a web-based delivery mechanism. The Internet is promoted as a superhighway of information, but in reality it typically serves as a conduit for educators seeking information and/or course materials (Forsyth, 2001). Through a connection to the Internet and a Web browser, one can access a predominantly text-based environment or a sophisticated multimedia delivery tool (Mioduser & Nachmias, 2002). Tim Berners-Lee, the inventor of the World Wide Web stated:

> The fundamental principle behind the Web was that once someone somewhere made available a document, database, graphic, sound, video, or screen at some stage in an interactive dialogue, it should be accessible by anyone, with any type of computer, in any country. And it should be possible to make a reference– a link– to that thing, so that others could find it. (Berners-Lee, 1999, p. 37)

The concept of web-based delivery of learning material to any computer– anywhere– that can access the Internet through a Web browser specifically refers to the readily available, interactive, multimedia nature of web-delivered training (Hall, 1997). The growing presence of the Web has taken a central role in information access and dissemination. Learners can spend less time searching for information and more time creating meaning by having the most up-to-date information by the experts who created that information (Beer, 2000).

CD-ROM as a Delivery Mechanism

The CD-ROM, used as a delivery mechanism, offers a convenient package for distribution and the nearly universal availability of a CD-drive in most personal computers broadens its acceptance (Wisher & Curnow, 2003). CD-ROM, the current delivery technology of choice for many multimedia-based programs (Piskurich, 2000), will likely become a key element in delivery of professional development and training (Barron & Orwig, 1995; Vaughan, 2001) because it can easily focus on educational professional development and other instructional needs, making it an excellent choice (Barron & Orwig, 1995).

When compared to the distribution costs of paper or diskettes, a compact disc provides an economical and durable way to publish and disseminate information. While CD-ROM has emerged during the last few years as the most cost-effective distribution medium for media projects, presently, CD-ROM is receiving less attention as a vehicle for learning than web-based learning (Smedt & Black, 2002).

Portable Document Format (PDF) Documents as a Delivery Mechanism

The computer screen is well-suited for rapidly and accurately presenting information that can be reduced from large amounts of data. Portable Document Format [PDF] documents, are

digital files, similar to text files and image files (Van Horn, 2001), and can be viewed from almost any computer using free Adobe Acrobat Reader software and are even easily accessible even to people with blindness or low vision (Raymond, 2001). However, Krim (2003) points out that sometimes people do not wish to read learning material from a computer screen. In particular, PDF documents can become unwieldily for learners, if the document contains large amounts of uninterrupted text, which is difficult to read on screen. Krim adds that PDF documents are also thought of as static objects, out of place in the dynamic Web environment. However, when printed out as hard-copies for off-line reading, PDF documents retain all formatting of the original document. The document stays intact just as it appeared on the computer screen and looks as it did onscreen.

Lack of Research

A thorough review of the research did not yield any studies directly addressing delivery of teacher professional development that collectively included web-based, CD-ROM, and PDF documents as simultaneous choices for delivery. Despite a significant interest in the scale of the actual and potential use of media as delivery vehicles for teacher learning, various formats are just beginning to be explored. Nationally and internationally, there is currently an acute shortage of quantitative information, as well as other formal and empirical research on the extent of use of these media for delivery for teacher professional development (Liaupsin, 2002; European Center for the Development of Vocational Training, 2002; Aleven, Stahl, Schworm, Fischer, & Wallace, 2003; Northeast and the Islands Regional Technology Consortium [NEIRTEC], 2002). However, some related studies could be located that are listed as follows.

In part, Schofield, Melville, Bennet, and Walsh's (2001) study addressed Australian teachers' knowledge of and experiences with online learning through the Internet. It was

determined that the use of online technologies to facilitate learning by the 18 teachers in the study was not simply a matter of updating or refreshing traditional professional practice but instead represented and required a break with the past and the construction of a new and more complex practice. That study also indicated that the culture in teachers' respective schools did not appear to encourage the teachers' use of the media for professional development.

Liaupsin's (2002) comprehensive review of current research found that digitized media have made some inroads in teacher learning, particularly in the areas of special education and linguistics, but it is primarily utilized as learning tools for classroom students.

Results from Sharma's (1998) research of computer-assisted language learning (CALL) with CD-ROM media indicated CD-ROM has become established as a highly popular learning tool with learners. That research found that a CD-ROM learning environment can aid the processing and the recall of information and language when these are delivered, and processed simultaneously through both the verbal and non-verbal channels.

Researchers Rosser, Herman, Risucci, Murayama, Rosse, and Merrell (2000) found the CD-ROM beneficial in surgical continuing education, improving efficiency, effectiveness, standardization, and access. When experienced surgeons and surgical residents used the CD-ROM as a vehicle for a laparoscopic development course, the researchers found that the media using video demonstration of surgical procedures effectively transfered cognitive information necessary for skill development and was an acceptable individualized and self-paced learning mode for surgical education.

Dugas, Green, and Leckie (1999) conducted a study across Canada as part of Canada's Human Resources Development to determine what media workers throughout the country predominantly utilize for learning in workplace settings. They found that in over 700 business

establishments across Canada, the most frequently preferred and used medium was CD-ROMs, when compared to traditional employee training sessions.

Deshler, Schumaker, and Fisher's (1996) study developed a computer-based interactive multimedia program on CD-ROM for teacher professional development in a university education course. Learning material included many of the known principles of effective ongoing teacher development. In that study, the media was presented like a book, and comprised nearly 100 electronic pages of content covering six chapters, and each chapter included four separate subsections. The titles for these sections and chapters were listed in a table of contents that was always present along the right-hand quarter of the computer screen. Using a mouse, a teacher could select any section or chapter, at any time and as often as wanted. Results were found to be positive ratings by the 10 teachers participating in the study.

Jung's (2001) study consisted of a study of the use of web-based professional development modules by 680 Korean teachers. Teacher learning consisted of 11 module topics applicable for ongoing professional development. Of the 680 teachers, 54 percent responded positively to the online professional development. It was determined that many of those teachers who resonded negetively lacked computer skills. More than 70 percent of respondents indicated that they preferred online training to conventional methods because of its flexibility and attractiveness.

Section Summary

The review of the literature on technological resources for delivery of professional development produced several major propositions that are important to this study:

- Scholars Peter, (2002) and Jochems, van Merriënboer, and Koper (2004) point out that delivery of web-based, CD-ROM, and PDF documents as digital

learning modules for professional development do not replace traditional media but generally are added to those earlier media and increase the existing possibilities, with only the intensity of use varying from time to time.

- Experts in web-based delivery systems (e.g., McGreal, 1997; Dwyer & Li, 2000; National Staff Development Council, 2001; Bertrand-Hines, 2000; Duhaney, 2000; Treacy, Kleiman, & Peterson, 2002; CEO Forum on Education and Technology, 2000;UNESCO, 1987; Vermeire, Carbonez, Darius, & Fresen, 2002; Fankhauser & Lopaczuk, 1996; Mioduser & Nachmias, 2002; Summers & Reck, 1998) view digital formats for professional development as having the potential to:
    - provide just-in-time learning,
    - make learning convenient in confidential settings,
    - address different learning styles and needs,
    - provide many different types of learning activities,
    - target learning topics when designed as self-paced study modules,
    - offer opportunities for updating or upgrading teachers' knowledge, skills, or competence,
    - allow anytime-anywhere learning,
    - free teaching and learning from the constraints that learner and instructor must be in the same classroom,
    - provide alternative opportunities for teachers,
    - customize learning modules designed for teacher learning,
    - customize courseware to specific objectives of teacher, and
    - allow the learner to select delivery format.

- Experts in instructional technology and media design (e.g., Killion, 2000; Driscoll, 1998, Smedt & Black, 2002) point out that the Web and CD-ROM are essentially a similar interface to the user, based on browsing interactions. The fact that a CD-ROM must be physically compiled has no intrinsic impact on the learner experience.

- Driscoll, (1998) and Schank, (2002) stipulate web-based and CD-ROM learning is not suitable for or adaptable to every situation. Driscoll (1998) offered two indicators to determine whether or not web-based and CD-ROM learning is appropriate for a situation including 1) when there is a gap in learners' skills and knowledge and 2) when there is a need for cognitive skills.

- Other experts in web-based learning environments (e.g., Goldman, 2001; Beer, 2000; Johnson, 2000; Leblanc, Saury, Seve, Durand, & Theureau, 2001; North Central Regional Educational Laboratory, 1999) suggest that professional development learning opportunities ought to be more than a single delivery method. The unique capability of various media innovations including the Web, CD-ROM, and PDF documents justifies consideration of including one or more of these approaches as packaged learning opportunities for teacher professional development.

- Smedt and Black (2002) indicated that CD-ROM is receiving less attention as a vehicle for learning than delivery through the Web and the Internet, but Wisher

and Curnow (2003); Barron and Orig (1995); Piskurich, 2000; and Vaughan (2001) indicated that the CD-ROM, used as a delivery mechanism:

- offers a convenient package for distribution
- has nearly universal availability (due to a CD-drive in most personal computers)
- is the current delivery technology of choice for many multimedia-based programs
- will likely become a key element in delivery of professional development and training
- can easily focus on educational professional development and other instructional needs, making it an excellent choice

- Krim (2003) pointed out that sometimes people do not wish to read learning material from a computer screen. In particular, PDF documents can become unwieldily for learners if the document contains large amounts of uninterrupted text, which are difficult to read on screen. Krim adds that PDF documents are also thought of as static objects, out of place in the dynamic Web environment. However, when printed out as hard copies for offline reading, PDF documents have the advantages of other formatted print documents.

- As pointed out by several researchers (e.g., Liaupsin, 2002; European Center for the Development of Vocational Training, 2002; Aleven, Stahl, Schworm, Fischer, & Wallace, 2003; The Northeast and the Islands Regional Technology Consortium [NEIRTEC], 2002), nationally and internationally there is currently an acute shortage of quantitative information, as well as other formal and

empirical research on the extent of these media for delivery for teacher professional development.

- Researchers Jung (2001), Dugas, Green, and Leckie (1999), Liaupsin (2002) Sharma (1998), Rosser, Herman, Risucci, Murayama, Rosse, and Merrell (2000), and Deshler, Schumaker, and Fisher (1996) found CD-ROM to be a highly popular learning tool with learners.

Chapter Summary

The purpose of this literature review has been to focus and present relevant information found in various studies to better understand the potential receptivity for technological delivery of professional development. There are clear threads throughout the literature review to indicate directions for the current investigation, and each individual section offered a clear summary of key propositions that are important to this study.

Those threads are:

- Public school educators, as adult learners, have a readiness to learn and are capable and able to learn. When given the opportunity, adults can initiate and take responsibility for their learning on their own through various strategies and resources. Adults prefer to learn in a variety of ways and through a variety of resources, and one of those ways can be web-based learning (available in this study). Web-based learning as a learning resource allows educators to control their own learning according to their own time schedule, and this, in turn, nurtures self-directed learning.

- The concept of professional development implies that the process of educators' ongoing learning is a personal approach to improving oneself and one's teaching through a variety of learning opportunities. Delivery of professional development through traditional workshops/training has become problematic when educators view learning as time-based mandates or pre-prepared lectures often devoted to generic information. The individually guided activities/personal growth model is one alternative to workshops and it is a strategy that promotes high-quality learning through various self-selected choices for learning opportunities that educators make for their ongoing learning. The individually guided activities/personal growth model can incorporate web-based, CD-ROM, and PDF files as learning resources. These resources offer flexible and self-paced learning opportunities that can expand educators' professional knowledge, skills, and attitudes throughout their career.

- Today's technologies are capable of delivering fully self-contained learning modules. Web-based, CD-ROM, and PDF documents do not replace traditional media, but by adding these media to more traditional delivery modes applicability to educators' ongoing work can be increased. Learning through the Web and CD-ROM are essentially similar to the user, based on browsing interactions. Though web-based and CD-ROM learning are not suitable for or adaptable to every situation, either can be utilized when there is a gap in learners' skills and knowledge and when there is a need for cognitive skills.

Although the notion of delivery of professional development through various media has been accepted, these delivery systems are just beginning to be explored. In particular, addressing delivery of teacher professional development that collectively includes web-based, CD-ROM, and PDF documents as simultaneous choices for delivery has not yet been studied, but it is worth investigation considering the large population of K-12 educators in American public schools that have need of professional development opportunities.

Chapter III

Research Design

The purpose of this study was to discover which technological delivery media (web-based, CD-ROM, PDF documents as downloadable files for print from the Internet) educators in Alabama public school systems select most often for delivery of their own professional development, why they select them, and whether or not they prefer those modes of professional development to the more traditional modes previously experienced.

The 15 professional development module topics for this study were listed on p. 6 of Chapter I. Web-based availability was accomplished by the researcher constructing each of the 15 modules in an HTML format, using Macromedia Dreamweaver software on a PC system. Each module was uploaded by the researcher onto the Alabama PEPE website server. When Alabama educators connected to that website, they would see a link available to them to access any of the modules. From this list of module topics educators could select any linked module they wished to study. No module was prerequisite to any other module. Furthermore, exact duplicates of the modules were copied onto CDs by the researcher. CDs were made available to the Alabama State Department of Education for further distribution into Alabama public schools. It is not known to the researcher to what extent distribution of CDs ensued. For users with PC systems, the CD included an autorun feature specific to Microsoft Windows that would open the user's Web browser automatically when the CD was inserted into the CD-drive. Software used to copy modules onto CDs was utilized to in order to make those CDs a hybrid CD, meaning that the CD would function perfectly if users used either PC or MAC computers. The opening page of the CD-ROM, like the opening Web page, contained the list of module topics exactly as it appeared and functioned through the online PEPE Web server that contained the online modules. Regardless of whether users chose the online or CD-ROM version, content and process were the

same. Each module contained a link to download that particular module in Adobe PDF format. The title page of each of the 15 modules included a clearly labeled link for downloading that specific module with the words "right-click and select "save as." Educators could download the PDF document onto their own computers for later reading and to print out their own personal hardcopy of the module in its entirety, if they desired to do so.

The study also examined some selective demographic factors that could influence educators' perceptions and their choices of the media to learn new knowledge and skills. These variables include grade levels of school in which they work, highest degree received, and years of teaching experience.

A descriptive research approach was used to profile public school educators in Alabama. According to Gay (1992), a descriptive research study involves collecting data to answer questions or test hypotheses concerning the current status of the subjects of the study. It "determines and reports the ways things are" (p. 13).

This chapter presents the demographic information for the population and sample, explains the design of the instrument (the survey questionnaire), and reports the procedures of data collection and data analysis.

Research Questions

The foundation of the study consisted of three research questions:

1. When given choices among technological delivery of professional development (Web-based, CD-ROM, downloadable files), which medium do educators select most often and why?

2. Do educators at this point in time express greater preference for self-paced, technology delivered professional development than for more traditional forms (workshops, seminars, college courses) of professional development activities? Why or why not?

3. Are there differences in the preferences of educators regarding delivery of professional development based on grade levels of school, highest degree held and years of teaching experience.

Population and Sample

Theoretically, the study population in this research consisted of all Alabama public school (P-12) educators. However, the sample actually used for the research consisted of educators in Alabama public school systems who completed one or more modules and an online or hard-copy version of an evaluation questionnaire provided by the project staff (which, included the investigator) prior to April 15, 2004. A more detailed explanation follows beginning with the instrumentation section of this chapter. The dates for survey collection extended over the 2003-2004 school year for Alabama public educators. Module users were not required to complete the evaluation form. Completion was voluntary.

Obviously, 28 participants is a very small sample for a study of this type. However, the size of the sample was beyond the control of the researcher, since 1) module users were free to return the questionnaires or not, and 2) there was no available list of users and no way of encouraging participation in the study. The size of the sample clearly make this an exploratory study and that sets the stage for additional studies in Alabama and elsewhere.

Instrumentation

As discussed in Chapter II, the modules being used by Alabama teachers were developed under the state's Title II grant from the United Stated Department of Education through the Alabama Teacher Quality Enhancement Project and in conjunction with Alabama Professional Education Personnel Evaluation (PEPE) program. The modules consist of a number of segments of teacher instruction existing on the Alabama PEPE website and on CDs. They are intended to

provide knowledge and skills directly related to the competencies and indicators which are the foundation for the Alabama teacher evaluation system. Their purpose is to complement the Alabama teacher evaluation system which yields data about each teacher's relative instructional strengths and weaknesses. The modules were developed in accordance with the Alabama teacher performance standards, so that they could be used to improve areas of teachers performance identified as weaker areas through PEPE evaluation. As previously noted, the modules were constructed by the researcher and electronically sent to the PEPE website server where they resided for online accessibility by educators. A duplicate of the modules were copied onto CDs and those CDs were mailed to Alabama public schools for availability, as well.

In order to gather information regarding the technological media (web-based, CD-ROM, PDF documents as downloadable files for print from the Internet) Alabama public school educators selected most often for delivery of professional development, the researcher developed a survey instrument (see Appendix A). The instrument was developed because there was no employable instrument available.

The module project has its own 2-part survey, one part consisting of demographics, and the other part having items not related to this study. The primary purpose of that survey is to gain teacher feedback about the content and format of the modules. To prevent teacher module users from being bombarded with multiple surveys, forcing them to repeat such things as demographic sections, project staff involved with the Alabama professional development (PEPE) program granted this researcher permission to add items to the original survey, and to use certain demographic items which would have been duplicative items in the two surveys. A copy of the enhanced survey can be found in Appendix A.

Items added to the original project survey included Section D, consisting of a series of 8 questions related to users opinions about technological delivery media. The 8 item section was

one in which the respondent marked one of five Likert-type values for a statement, varying from strong agreement to strong disagreement. Responses were converted to the numerical values of 1, 2, 3, 4, and 5 for statistical analysis.

Section E was also a new section of the survey, added by the researcher. It includes 6 questions related to opinions on delivery method. Items 1, and 3-5 relate to prior experience with technological delivery methods available to respondents, and their reasons for using various methods. The respondant can check all that applied. The second question is a rank-ordering of five methods appropriate to receiving professional development. The respondant is asked to rank the methods from 1-5 according to his/her preference for each method, with 1 being the highest ranking. Item 6 is an open-ended question allowing respondents to list other reasons for decisions than those previously listed by the researcher.

A pilot study was conducted during the previous school year (2002-2003) to verify the clarity of the questions and to identify unexpected problems. The questionnaire and a feedback form were completed by 12 Alabama participants in the hands-on workshop introducing modules. Some minor potential problems in instrument administration, scoring routines, and data processing were identified, and subsequent research procedures were refined accordingly.

Data Collection Procedures

The study was conducted at the University of Tennessee from 2003-2004. Approval to conduct the research study was granted by the University of Tennessee Committee on Research Participation (Appendix B) prior to the collection of data. To proceed with the data collection, the researcher entered into an agreement with the principal investigators involved in the development of the Alabama PEPE evaluation system and the professional development

modules. Procedures and the data collection instrument were approved by those individuals prior to their use. After approval, the collection of data was begun.

In order to strive for a high rate of returns, the researcher used the following five strategies built into the design of each individual module. Respondents found a clearly labeled section containing four hyperlinks that allowed access to the questionnaire within every module, regardless of the format (Web or CD-ROM) chosen. Each module included this section, which was located at the end of every module. The section actually consisted of four hyperlinks grouped in a table. The heading of the section containing the hyperlinks for the survey stated, "Professional Development Modules Feedback Form," and below that line stated, "Please take a few moments to provide feedback about the Alabama Professional Development Modules." Below this line were the words highlighted in bold text stating, "ONLINE LINKS," followed by two hyperlinks electronically leading to the survey. Below those hyperlinks, was another line of words highlighted in bold text stating, "OFFLINE LINKS - Downloadable." It was followed by two other hyperlinks that contained the actual survey in Microsoft Word format. By using the "offline links," participants could then either e-mail the survey to the researcher or print it out and submit it to a PEPE coordinator, who would in turn, mail it directly to the researcher. Finally, for those respondents who did not wish to utilize electronically devised methods to submit a survey, pre-printed (hard-copies) of the survey were available from a PEPE coordinator. Submission procedures are explained in greater detail below.

Online Links: Electronic Survey Submission

One of the two hyperlinks following the text, "ONLINE LINKS" included a hyperlink stating, "Online Feedback Form" with accompanying text stating, "(Internet Explorer 4.0 or later & Netscape 6.0 or later)," intended for those participants using newer Web browsers (Netscape

and Microsoft Internet Explorer). A second hyperlink followed, and was also labeled "Online Feedback Form," but included the accompanying text, "(Netscape 4.0 through 4.76)," intended for those participants who were using older versions of the Netscape browser. The two hyperlinks corresponded to and ensured browser compatibility with the survey. In order to access the survey and to utilize a "submit" button built into the survey, the online survey had to reside on an Internet server, independent of the module; thus, hyperlinks were necessary in order to access the online survey. By clicking on either one of the hyperlinks, a separate Web browser window opened on the participant's screen and connected to the host server where the survey was residing. A survey completed online included a "submit" button for sending it online to the researcher. If the participant was utilizing the CD-ROM, however, the user had to connect to the Internet to access the server where the online survey was located and to utilize the "submit"button.

Offline Links: Internet (E-mail) Submission

The remaining two hyperlinks were located under the text heading, "OFFLINE LINKS - Downloadable." One hyperlink gave the participant the option to e-mail the survey. This hyperlink was labeled "Microsoft Word file," and was accompanied by the text, "(Word for Windows form - right click to save and download. Will be completed using Word and electronically e-mailed back.)" Because the survey, in this case, was downloadable, the survey in Microsoft Word file format resided with every module. Whether the respondent chose web-based or CD-ROM module delivery, a survey was accessible in exactly the same format. If using the CD-ROM, the survey could be accessed directly from the CD-ROM. In either case, Microsoft Word opened the survey, as it was a Microsoft document. The participant completed the survey and e-mailed it directly to the researcher. The survey listed the researcher's e-mail on the bottom

of the form with the instructions, "When completed, please save as a file and send as an attachment," with the researcher's email address. Additional instructions included, "(after saving file, you can click on "file" in the menu at the top and then select "send to" to initiate your e-mail)." Though e-mailing is obviously an electronic method, the reason this link is not in the above "online links" group is that, technically, the document could be saved on the participant's computer and completed at a later time for e-mailing back to the researcher. By suggesting to the participant to "right-click and save download" the Word document, it offered this convenience for the participant.

Print-Out, Fill-Out, Drop-Off Submission

The last link for the survey was also located under the "OFFLINE LINKS - Downloadable" text header with the hyperlink labeled, "Microsoft Word file print version," and was accompanied with the text, "Word for Windows form - right click to save and download. Print it out, complete it by hand, and return it to your PEPE coordinator.)" This, too, was a Microsoft Word document format, and once the link was "right-clicked and saved," the participant would then be able to open the document with Microsoft Word, enabling printing of a hard-copy on the participant's own printer. The educator could then complete the survey with either pen or pencil and return it to a PEPE coordinator. (PEPE coordinators are located in every school system in Alabama.) Coordinators could then mail the survey directly to the researcher.

Hard-Copy Submission

The pre-printed hard copies of the survey were placed in Alabama schools for those educators who did not desire to utilize the Internet or the CD-ROM versions. The PEPE coordinators assisted in making hard copies available to module users.

As it turned out, every questionnaire returned was returned online through the use of the "submit" button. As questionnaires were received by the researcher, each one was screened and given an identification number in the order in which it was received. Because module users were not required to fill out a questionnaire as they completed a module, the researcher did not have an option to "remind" educators to "send in his/her questionnaire." Thus, over the school calendar year, only 28 questionnaires were submitted by the cut-off date of April 15, 2004.

Analysis of Data

The variables in this study were the demographic characteristics of the respondents, including grade levels of school, highest degree held, and years of teaching experience, as well as the preferences of the 28 participants in this study regarding delivery of professional development including 1) online, 2) CD-ROM, 3) PDF documents downloaded from the Internet, 4) staff development workshops (meetings, conferences, 1-2 day sessions), and 5) college or other formal classes of full-time educators of Alabama public schools. Descriptive statistics were used to evaluate the educators' preferences and perceptions.

Survey results are reported without identification of the educators, school, or school system. Descriptive analyses have been employed to answer research questions 1 to 3.

The computerized process for data analysis was conducted by using the Statistical Package for Research Software program (SPSS). The data were organized and entered into the software program as required by the research design. Chi-square tests of significance were intended for use in research question 3 to analyze the relationships between educators' preferences and perceptions regarding delivery of professional development according to groups based on grade levels of school, highest degree received, and years of teaching experience. However, the low number of returned surveys did not yield enough data for the Chi-square tests.

Therefore, data for Research Question 3 are presented in table format with frequencies and percentages.

Survey responses are organized by research question. Further explanation of this process is provided below.

Research Question 1: *When given choices among technological delivery of media (Web-based, CD-ROM, downloadable files), which media do educators select most often and why?*

To answer this research question, the researcher assigned an identification number to each of the returned questionnaires. Frequencies and percentages of responses to Section A, items 9, 9b, and Section E, items 3 through 5 were calculated, and responses to question E6 (an open-ended question) were listed and summarized. Questions 9 and 9b, from Section A were used to answer the first part of Research Question 1 (which media do educators select most often). Questionnaire item 9 asked, "In completing the module, which format did you use? (Check all that apply)." Responses to this item identify which format or combination of media formats, including Online (web-based), CD-ROM, and PDF documents (print format) was selected most often in completing the module. A table was developed showing the frequencies and percentages of participants' responses to question 9. Question A9b asked, "Of the module formats used, which format was the predominant one?" This question clarified which method prevailed as dominant for those participants who checked more than one response to question A9.

To answer the second part of Research Question 1 (why participants chose that medium), items 3, 4, and 5 from Section E of the questionnaire were analyzed. Responses to these questions identified the media and respondents' reasons for utilizing the media they chose.

Question E3 stated, "For the module topic just completed, the following instructional delivery methods were available to you (check all that apply)." The choices included Online (web based), CD-ROM delivery, Print material, Workshop, and Formal Class. The analysis of responses to question E3 included a count of the frequency of each statement selected by educators. Calculation included the frequency of selection divided into the total number of respondents for each of the five instructional delivery methods that were available to the participants. The highest percentage showed the most often cited instructional delivery methods. A table was presented showing the ranking of the results of the responses, from highest to lowest.

Responses to question E4 (a through f) and E5 (a through i) were handled in the same way. Question E4 asked, "Why did you choose the delivery method(s) you used for studying the module you just completed? (check all that apply)." Question E4 included a series of six statements, a through f, that referred to specific reasons for choosing the delivery method(s) used for studying the module just completed. The analysis of responses to question E4 included a frequency count of each statement selected by educators. To arrive at the percentage of use, frequency of selection of the six statements was divided into the total number of respondents. The highest percentage indicated the most often cited reason for choosing the delivery method for completing a module, and was shown in a table.

The analyses of data for question E5 were handled in the same way. Question E5 asked, "Were any of the following reasons involved in your decision to use the delivery method(s) you chose for this module? (check all that apply)." Question E5 included a series of nine statements, a through i, which might denote other reasons for participants' decision(s) to use the delivery methods(s) they chose to complete a module. Analysis included a frequency count of each statement selected by educators. The frequency was then divided into the total number of respondents for each of the nine statements. A table presented ranking of the responses to show

the highest percentage of the most often cited reasons involved in respondents' decisions to use the delivery method for completing the module. The researcher calculated and discussed the differences found in response to questions E3 through E5.

Research Question 2: *Do educators at this point in time express greater preference for self-paced, technology delivered professional development than for more traditional forms (workshops, seminars, college courses) of professional development activities? Why or why not?*

This question focuses on respondents' opinions regarding electronic delivery versus traditional methods. Questionnaire items used to answer the first part of this question included Section D, items 2, 6, and 7 and item 2 from Section E.

Question E2 invited participants to rank-order their preferences for receiving professional development among five choices including online, CD-ROM, printed modules, workshops, and formal classes. A ranking of "1" for one of the choices available in question E2 indicated a participant's preferred method of delivery and a ranking of "5" denoted an individual's last choice of preference among the five choices offered.

Ideally, respondents would have selected preferences for receiving professional development instruction from among the five choices in their actual order of preference, beginning with ranking of "1" for the most preferred instructional method first, and their next most preferred method second, and so on. This should have automatically excluded from consideration an already selected choice from the remaining alternatives, during the selection process. However, thirteen respondents duplicated rankings from among the 5 choices offered. Those 13 were not included in the analysis.

Therefore, for the remaining fifteen submitted surveys, if a ranking preference of first-choice, ("1"), was selected only once, it was counted in the analysis. A table is presented that

shows rank order of selection of delivery of instruction of professional development format(s) that educators had available to them. Additionally, the number of persons choosing the highest ranked method was reported. The 5 choices for instructional methods included Online (web based instruction), instruction through CD-ROM delivery, instruction through printed (hard copy) modules, staff development workshops (meetings, conferences, 1-2 day session, etc., college or other formal classes). Analysis included a frequency count for each of the 5 delivery of instruction methods selected by educators. Frequency was then divided into the total number of respondents for each of the five choices. The highest percentage showed the most preferred selection of delivery of instruction of professional development. The researcher calculated and discussed the differences found between the highest and lowest ranked choices. The number of rankings of "1" for each method was determined to answer the first part of Research Question 2.

Items D2, D6, and D7 focused on respondents' reasons for selecting electronic delivery rather then traditional methods. Items D2, D6, and D7 employed five Likert-type values, with statements varying from strong agreement to strong disagreement. The highest value, "5" demonstrated Strong Agreement; the value, "4" denoted Agreement; the value of "3" was seen as Neutral. The value of "2" denoted Disagreement; and the value of "1" was used for Strong Disagreement.

The Likert technique has become one of the most widely used methods of attitude assessment. Likert scales present a set of attitude statements about some person, group, or thing. Respondents indicate the extent to which they agree or disagree with each statement, and the overall score then suggests whether the individual's attitude is favorable or unfavorable. Participants are asked to express agreement or disagreement on a five-point scale. Each degree of agreement is given a numerical value from one to five. Thus, a total numerical value can be calculated from all the responses.

Responses to items D2, D6, and D7 have been averaged separately to show if the mean score is higher or lower than 3, a neutral rating on the Likert-scale. This procedure determines if, at this point in time, educators expressed greater preference for self-paced, technology delivered professional development than for more traditional forms of professional development activities.

The same process was repeated to answer the "why" part of research question 2. To answer why educators at this point in time expressed greater preference for either self-paced, technology delivered professional development or for more traditional forms of professional development, items 1, 3-5, and 8 from Section D of the questionnaire were analyzed.

Research Question 3: *Are there differences in the preferences of educators regarding delivery of professional development based on grade levels of school, highest degree held, and years of teaching experience?*

Analysis of responses to Research Question 3 identified differences that existed among respondents based on demographic variables. Demographic variables used in relation to research question 3 included grade levels of school, highest degree received, and years of teaching experience (section A, questions 3, 5, and 7). Educators' preferences among five methods (online, CD-ROM, printed modules, workshop, and formal class) for receiving professional development instruction was found in responses to questionnaire section E, question 2.

Unfortunately, the low number of returned surveys did not yield enough data for the Chi-square tests, even after collapsing categories as shown in Table 4. Overlapping grade levels suggested combining elementary and middle grades rather than trying to distinguish between them. The largest single degree group (Bachelors) accounted for nearly half of the respondents. Less than Bachelors was too small in size to remain a category and it would be logically combined only with the Bachelor's degree category. The second group was composed of those with or exceeding a Master's degree. Had Master's degree been a second category (9

respondents) there would have been only six in the remaining group. Considering that not all respondents correctly recorded their preferences, the decision was made to use only two categories: Bachelor's degree or less, and Master's degree or higher. Therefore, data for Research Question 3 were presented in tables using frequencies and percentages.

Demographic variables including responses to items 3, 5, and 7, in relationship with responses to Section E, item 2 (the ranking-order question), were used to find differences in preferences of delivery method (web-based, CD-ROM, PDF print material, staff development workshops, and college courses) among the following demographic sub-groups: grade levels of school, highest degree earned, and teaching experience. In regard to the ranking-order question, if a ranking preference of first-choice was selected only once, that form was included in the analysis. Using only ranking data in which participants ranked all five delivery methods without duplicating one or more rankings, as planned, would have further reduced the number of usable forms. Therefore, the 15 forms with a clearly defined first choice were used for those tables presented. The tables include those 15 educators who expressed a preference among five different categories of delivery of instruction methods appropriate to the content they studied. Each respondent was counted only once, as preferring 1) Online (web-based instruction), 2) Instruction through CD-ROM delivery, 3) Instruction through printed (hard copy) modules, 4) Staff development workshops (meetings, conferences, 1-2 day sessions), and 5) College or other formal classes. After initial analyses of data were conducted as described above, relationships among participant responses were examined as potential contributors to conclusions and discussion of findings in Chapter 5 of the study.

Chapter Summary

This chapter described the research design that was employed in collecting data for this study, the instrument, procedures, and analysis used to conduct the research study. A total of 28 Alabama educators participated in this study. The complete results of the data analysis are presented in Chapter IV.

Chapter IV

Findings

The purpose of this study was to investigate which technological delivery media educators in Alabama public schools select most often for delivery of their own professional development. In particular, the media included web-based, CD-ROM, downloadable PDF files for print from the Internet. Additionally, this study looked at why they select them, and whether or not they prefer those modes of professional development to the more traditional modes previously experienced including in-service workshops and formal classrooms such as college classes.

This chapter presents the results of the investigation concerning the role of the media as reported by Alabama educators, and is organized into two sections. The first section presents selected participant information based on the participants' demographics according to Section I of the questionnaire, including grade levels of school, highest degree received, and years of teaching experience. The second section shows the results of the data analysis in response to the three research questions.

Participant Demographics

There were a total of 30 subjects who responded to the survey. Two subjects indicated they were from other states who happened to find the Alabama modules on the Web while they were looking for professional development material. Thus, those two questionnaires were not included in the sample.

Respondents were asked to indicate the grade levels of their schools (Table 1). There were four respondents (14%) who indicated that their school level included K-12, and it was

Table 1

Grade Levels of Schools of Participants

Grade Levels of School	Frequency	Percent
Elementary School		
Pre-K	1	4
Pre-K-6	1	4
K-6	3	11
K-5	1	4
1-5	1	4
K-12	4	14
Middle School		
4-8	1	4
5-8	6	21
6-8	1	4
High School		
9	1	4
8-12	1	4
9-12	1	4
11-12	1	4
11	1	4
Other Levels / No Levels		
None Indicated	4	14
Total	28	100%

determined those educators were more likely to be elementary teachers and were placed in that category. There were four respondents (14%) that did not respond to this question. Two respondents indicated the grade they actually taught, grade 9 and grade 11, rather then the grade levels of their schools.

The grade levels of participants' schools were further collapsed into two categories (Elementary and Middle School, and High School) for data analysis as shown in Table 2. Four of the 28 subjects did not respond to the grade levels question and were not included in the analysis.

According to their educational backgrounds (Table 3), respondents were asked to indicate the degree earned. Forty-three percent had a Bachelor's degree as their highest degree, and 32% had a Masters degree. The educational backgrounds were further collapsed into two categories (Bachelor's or less and Master's or higher) for data analysis as shown in Table 4.

Table 2

Grade Levels of School - Collapsed Categories

Grade Levels of School	Frequency	Percent
Elementary and Middle School	19	68
High School	5	18
No Response	4	14
Total	28	100

Table 3

Highest Degree Received

Highest Degree Received	Frequency	Percent
Less than Bachelors	1	4
Bachelor's	12	43
Master's	9	32
Master's +30	1	4
Master's +45	1	4
Ed. Specialist	3	11
Professional Degree	1	4
Total	28	100

Table 4

Highest Degree Received - Collapsed Categories

Highest Degree Received	Frequency	Percent
Bachelor's or less	13	46
Master's or higher	15	54
Total	28	100

According to their work experience (Table 5), the respondents were asked for their years of experience in education, but asked not to count the current year. Those responding (11%) with "None" would likely be first-year teachers. There were two (7%) that did not give any response to this question.

The years experience in education categories were further collapsed into three categories as shown in Table 6. As can't be seen in this analysis, 54 percent of the educators reporting experience had 11 years or more.

Results of Data Analysis in Response to the Three Research Questions

Findings of the study are organized by research question.

Research Question 1:

When given choices among technological delivery of professional development (Web-based, CD-ROM, downloadable files), which medium do educators select most often and why?

Section A, questions 9 and 9b of the questionnaire were used to answer the first part of Research Question 1 (which medium do educators select most often). To answer the second part of Research Question 1 (why participants chose that medium) responses to items 3, 4, and 5 from Section E of the questionnaire were analyzed.

Questionnaire item 9 asked, "In completing this module, which format did you use? (check all that apply)." Response patterns indicated which format or combination of media formats, including Online (web-based), CD-ROM, and PDF documents (print format) educators selected most often for delivery of professional development. Table 7 shows the frequency and percentage of participants' responses to question 9.

Table 5

Years Experience in Education

Experience	Frequency	Percent
None	3	11
2 years	1	4
4 years	1	4
5 years	1	4
6 years	3	11
7 years	1	4
8 years	1	4
10 years	1	4
11 years	1	4
12 years	1	4
18 years	1	4
19 years	3	11
22 years	1	4
25 years	2	7
28 years	2	7
29 years	1	4
31 years	1	4
32 years	1	4
No response	2	7
Total	28	100

Table 6

Years of Experience - Collapsed Categories

Years of Experience (Not counting current year)	Frequency	Percent
0 - 5 years	6	21
6 - 10 years	6	21
11 + years	14	50
No response	2	7
Total	28	100

Table 7

Format Used In Completing The Module

Format	f	(%)
Online	23	82.1
CD-ROM	3	10.7
PDF	0	0.0
Online and CD-ROM	2	7.1
Online and PDF	0	0.0
CD-ROM and PDF	0	0.0
All	0	0.0

Total Respondents = 28

Question 9b from the questionnaire asked, "Of the module formats used, which format was the predominant one?" Both respondents who answered using Online and CD-ROM for delivery of a professional development module indicated Online as the predominate format. The most used format was clearly Online (25 of 28 participants).

Table 8 shows rank order of selection of delivery of professional development format(s) that were available to educators. Question E3 stated, "For the module topic just completed, the following instructional delivery methods were available to you (check all that apply)." The online (web-based) format was available to all educators who answered the questions.

Other formats included print, CD-ROM, workshop and formal class. Print format was available to almost 23 percent of the participants; both CD-ROM and workshop were available to about 18 percent, and formal class such as a college course was available to 14 percent of respondents.

Table 8

Rank Order of Delivery Formats Available to Participants

Delivery Method	f	(%)
Online	22	100.00
Print	5	22.7
CD-ROM	4	18.2
Workshop	4	18.2
Formal Class	3	13.6

Total Respondents = 22

To answer the second part of Research Question 1 (why participants chose that medium) responses to items 4 and 5 from Section E were analyzed. Twenty-two respondents (79%) answered these questionnaire items.

Question E4 asked, "Why did you choose the delivery method(s) you used for studying the module you just completed? (check all that apply)." Table 9 shows reasons for selection of medium in rank order.

The most frequently selected response, and the largest percentage (73%), were told which delivery method to use to study the module. A close second was the convenience and/or the ease of access to the professional development material (64%). Eleven (50%) respondents checked the flexibility of completing the module according to their own time schedules. Five respondents, 23 percent, indicated privacy was not a major concern. Only four, or 18 percent of respondents, checked that they like to work by themselves.

Question E5 asked, "Were any of the following reasons involved in your decision to use the delivery method(s) you chose for this module? (check all that apply)." Table 10 shows the reasons marked in rank order.

In response to questionnaire item E5, responses for only four of nine items were ranked because the other five items were not checked by anyone. Only 10 people responded to this question. Three respondents or 30 percent, checked that the medium offered greater portability; they liked being able to carry with them a CD-ROM and/or hard-copies containing professional development material. Three respondents or 30 percent, indicated they did not like to keep track of hard-copies (print) containing professional development material.

Two respondents marked the statement, "I don't like the hard-copy printout because it is like reading a text book," and two marked, "I like to read the material from a computer screen." No other items in the list provided were marked.

Table 9

Participants' Reasons for Choosing Delivery Method

Reason	f	(%)
I was told to study the module using this delivery method.	16	72.7
Convenience/ease of access.	14	63.6
Flexibility of completing the module on my time schedule.	11	50.0
When using this method, I was not concerned with privacy.	5	22.7
I like to work by myself.	4	18.2
I was most comfortable with this method(s).	3	13.6

Total Respondents = 22

Table 10

Other Reasons Given By Participants for Choice of Delivery Method

Delivery Method	f	(%)
It offers greater portability (I can take the CD or print copy with me).	3	30.0
I don't like to keep track of hard-copy printouts.	3	30.0
I don't like the hard-copy printout because it is like reading a text book.	2	20.0
I like to read the material from a computer screen.	2	20.0
My Internet connection is too slow for use of the online format.	0	0.0
I don't have access to a printer to make hard-copy printouts.	0	0.0
I had no access to the PEPE website at school/work or at home.	0	0.0
CD's and print copies are "permanent", the web format is temporary.	0	0.0
My Internet connection is not reliable/stable enough for me to use the Web.	0	0.0

Total Respondents = 10

Research Question 2:

Do educators at this point in time express greater preference for self-paced, technology delivered professional development than for more traditional forms (workshops, seminars, college courses) of professional development activities? Why or why not?

This question investigated respondents' opinions of electronic delivery versus traditional methods. Questionnaire items used to answer the first part of Research Question 2 included Section D, items 2, 6, and 7 and E2.

Question E2 asked participants to rank-order their preferences for online, CD-ROM, printed modules, workshops, and formal classes as methods of delivery for professional development. A ranking of "1" on question E2 indicated a participant's preferred method of delivery. The number of rankings of "1" for each method was determined to answer the first part of Research Question 2. The second part was addressed by questions D1, D3 through D5, and D8.

For rank-order to be used in this analysis, respondents were to have selected preferences for receiving professional development instruction from among the five choices in their actual order of preference, beginning with ranking of "1" for the most preferred instructional method first, "2" for their next most preferred method, and so on. This should have resulted in only one delivery method ranked "1," one method each ranked "2" through "5." However, 13 respondents either gave the same rank to more than one delivery method or did not answer this question, so that there was no single method ranked "1". Those 13 surveys were not included in the analysis. Twelve respondents followed directions and assigned rankings from 1 to 5 without duplication. Three additional respondents correctly ranked only one method as "1" but had one or more duplicate rankings of other ranks. For those 15 submitted surveys, a ranking preference of first-choice, ("1"), was selected only once, and it was counted in the analysis. Each respondent was

counted only once, as preferring 1) Online (web-based instruction), 2) Instruction through CD-ROM delivery, 3) Instruction through printed (hard copy) modules, 4) Staff development workshops (meetings, conferences, 1-2 day sessions), and 5) College or other formal classes. If only rankings in which participants ranked all five delivery methods without duplicating one or more rankings, there would have been only 12 usable responses.

Table 11 shows delivery preferences based on rankings. Among the five choices for educators' preference of delivery of professional development, online was selected as preferred by 60 percent of those who responded. College courses were the second choice of preference, (26.7%). Printed material and workshops each received one vote. CD-ROM received no votes.

The three items, D2, D6, and D7 investigated respondents' preferences for delivery method. Respondents responded to each of these items using a 5-point Likert scale. The highest value, "5" denoted Strongly Agree, "4" denoted Agree, "3" indicated a Neutral response, a "2" rating indicated disagreement, "1" denoted Strong Disagreement.

Responses to items D2, D6, and D7 (see Table 12) were averaged separately to determine if mean ratings were higher or lower than 3, a neutral rating on the Likert-scale. Mean ratings higher than "3" to items D2 and D7 indicated general preferences in delivery method among the respondent groups, and the mean rating for item D6 offers insight into the importance respondents placed on controlling schedule.

For question D2, 68.4 percent of the 22 respondents strongly agreed or agreed that they preferred using online and/or CD-ROM delivery of professional development to meetings and workshops.

Fifteen of 22 respondents (68.2%) agreed or strongly agreed that they preferred online and/or CD-ROM for delivery of professional development because they favor being able to control their own schedules.

Table 11

Respondents' Delivery Preferences Based on Rankings

Preference	n	(%)
Online	9	60.0
College Courses	4	26.7
Printed Modules	1	6.7
Workshops	1	6.7
CD-ROM	0	0.0

Total Respondents = 15

Table 12

Participants' Responses To Questions D2, D6, D7

Question	SA f (%)	A f (%)	N f (%)	D f (%)	SD f (%)	Mean
D2: I prefer online or CD-ROM professional development modules to meetings and workshops.	8 (36.4)	7 (31.8)	4 (18.2)	2 (9.1)	1 (4.5)	3.86
D6: I prefer online or CD formats for professional development because I can control my own schedule.	10 (45.5)	5 (22.7)	6 (27.3)	0 (0.0)	1 (4.5)	4.05
D7: I prefer workshops or group professional development because I feel that learning is largely a social experience that online or CD-ROM does not offer.	3 (13.6)	4 (18.2)	10 (45.5)	3 (13.6)	2 (9.1)	3.14

Total Respondents = 22

Mean is based on Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1

In answering question D7, 46 percent of the respondents were neutral to the idea of learning as largely a social experience. This item focused on the social aspect of professional development as the reason for choosing workshops or group activities. Thirty-two percent of the participants indicated (Agreed or Strongly Agreed) that the social contact is at least one reason they would prefer workshops or group activities.

The means for all three items were between 3 (Neutral) and 5 (Strongly Agree). The highest mean (4.05) indicating the highest level of agreement, was for question D6. The lowest mean (3.14), barely above the Neutral rating of 3, was for question D7. As already mentioned, almost half of the participants gave 3 as their rating for this item

The same process as was used to answer the first part of the question was repeated to answer the "why" part of Research Question 2. To answer, " why do teachers at this point in time express greater preference for either self-paced, technology delivered professional development or for more traditional forms of professional development?" items 1, 3-5, and 8 from Section D of the questionnaire were analyzed. Table 13 shows responses to those items. Eighty-two 82 percent of the respondents (22), to question D1, strongly agreed or agreed that online or CD-ROM learning is effective when utilized as an integral part of professional development. No respondent disagreed or strongly disagreed with item D1.

In responding to question D3, educators predominantly disagreed or strongly disagreed (68.2%), suggesting that they would have used delivery of online and/or CD-ROM for professional development regardless of the availability of other delivery methods.

Question D4 responses show that 73 percent of the respondents thought they learned as much from online or CD-ROM professional development modules as they would have from a workshop on the same topic.

Table 13

Participants' Responses To Questions D1, 3-5, 8

Question	SA f (%)	A f (%)	N f (%)	D f (%)	SD f (%)	Mean
D1: Online or CD-ROM learning is effective when utilized as an integral part of professional development.	13 (59.1)	5 (22.7)	4 (18.2)	0 (0.0)	0 (0.0)	4.40
D3: I would not have used Alabama's online or CD-ROM professional development had there been another option.	1 (4.5)	1 (4.5)	5 (22.7)	9 (40.9)	6 (27.3)	2.18
D4: I think I learned as much from a online or CD-ROM module as I would have from a workshop on this topic.	10 (45.5)	6 (27.3)	3 (13.6)	2 (9.1)	1 (4.5)	4.00
D5: I will seek other opportunities to pursue professional development through CDs or online activities.	13 (59.1)	5 (22.7)	3 (13.6)	1 (4.5)	0 (0.0)	4.36
D8: I believe Alabama's online or CD-ROM professional development are more effective than other methods I have experienced.	5 (22.7)	4 (18.2)	9 (40.9)	3 (13.6)	1 (4.5)	3.40

Total Respondents = 22
Mean is based on Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1

An overwhelming majority of respondents (82%) indicated that they will seek other opportunities to pursue professional development through CDs or online activities (question D5). While one respondent disagreed with this question, no respondent strongly disagreed.

Only 41 percent of educators agreed or strongly agreed that they believed Alabama's online or CD-ROM professional development are more effective than other methods they have experienced (question D8), and 41 percent of respondents were neutral in response to this statement.

The mean ratings for items D1, D4, and D5 were all 4 (Agree) or above. The mean rating for item D8 was above the Neutral point of 3, but lower than 4. The substantial percentage of Neutral ratings suggests that a number of respondents were ambivalent about online or CD delivery of professional development being more effective than traditional means. While the mean for D3 indicates disagreement, the wording of the item calls for a negative response, if participants prefer technological delivery methods.

Research Question 3:

Are there differences in the preferences of educators regarding delivery of professional development based on grade levels of school, highest degree held, and years of teaching experience?

Research Question 3 seeks to identify any differences that might exist among responses based on selected demographic variables of respondents to questionnaire items. Demographic variables used for Research Question 3 include grade levels of school, highest degree received, and years of teaching experience (questionnaire Section A, questions 3, 5, and 7). Educator preference for delivery method is found in questionnaire Section E, question 2.

Unfortunately, this number of questionnaires (28) did not yield enough data for the Chi-square test, even after collapsing categories. Therefore, data for Research Question 3 are presented in table format using frequencies and percentages.

As previously discussed, if a ranking preference of first-choice was selected only once, to question E2, that form was included in the analysis. Using only ranks in which participants ranked all five delivery methods without duplicating one or more rankings, as planned, would have further reduced the number of usable forms. Therefore, the 15 forms with a clearly defined first choice were used for the tables that follow.

All tables include those 15 educators who expressed a preference among five different categories of delivery methods appropriate to the content they studied. Each respondent was counted only once, as preferring 1) Online (web-based instruction), 2) Instruction through CD-ROM delivery, 3) Instruction through printed (hard copy) modules, 4) Staff development workshops (meetings, conferences, 1-2 day sessions), and 5) College or other formal classes.

Delivery Preferences of Educators by Grade Levels of School

The frequency and percentage of delivery preferences based on Grade Levels of School including the collapsed groups, Pre-K through middle grades, are shown in Table 14. Results can only be reported for the Pre-K through middle group because all five high school respondents and 11 Pre-K through middle grades respondents duplicated rankings from among the 5 choices offered or did not answer this question. The remaining 12 questionnaires were all completed by educators in schools with Pre-K through middle grades.

Of the Pre-K through middle grades group, 66.7 percent of the respondents indicated online as their preference for delivery of professional development. College courses was the

Table 14

Delivery Preferences of Alabama Educators by Pre-K - Middle Grade Schools

	Pre-K - Middle n = 12
Format	**f (%)**
Online	8 (66.7)
CD-ROM	0 (0.0)
Print Material	1 (8.3)
Workshops/Staff Meetings	1 (8.3)
Formal College Course	2 (16.7)

Note: The High School respondents and 11 Pre-K-Middle respondents could not be included because no preference could be determined.

second choice (16.7%), and print materials and workshops were each selected as first choice by eight percent of those responding. CD-ROM was not preferred by anyone.

Delivery Preferences of Educators by Educational Background

The frequencies and percentages shown in Table 15 are delivery preferences of respondents based on Educational Background using the collapsed groups (Bachelor's degree or Less, and Master's degree or Higher). Of the 28 total respondents, 15 were usable for determining delivery preferences. The other13 respondents were those who either left blank or incorrectly answered questionnaire item E2. This left eight usable surveys of respondents with a Bachelor's degree or less and seven respondents with a Master's degree or higher. Fifty percent

Table 15

Delivery Preferences of Alabama Educators by Educational Background

	Educational Background	
	Bachelor's or Less n = 8	**Master's or Higher n = 7**
Format	**f (%)**	**f (%)**
Online	4 (50.0)	5 (71.4)
CD-ROM	0 (0.0)	0 (0.0)
Print Material	1 (12.5)	0 (0.0)
Workshops/Staff Meetings	1 (12.5)	0 (0.0)
Formal College Course	2 (25.0)	2 (28.6)

of the eight educators with a Bachelor's degree or less who appropriately completed questions selected online as their preference of delivery of professional development. Twenty-five percent of respondents with a Bachelor's degree or less also selected formal college courses, while print material and workshops each received 13 percent of the responses.

Of the seven educators with a Master's degree or higher, whose questionnaires could be used (7 questionnaires), 71 percent selected online as their preferred choice for delivery of professional development, and 29 percent selected formal college courses. CD-ROM was not selected by either group. In both groups, online delivery was preferred by most respondents.

Delivery Preferences of Educators by Years of Experience

Table 16 shows the frequency and percentage of delivery preferences of respondents based on Years of Experience, using the collapsed groups: 0-5 years, 6-10 years, and 11+ years. Of the 28 respondents, 15 were usable for determining delivery preference. Of those usable

Table 16

Delivery Preferences of Alabama Educators by Years of Experience

	Years of Experience		
	0-5 years n = 5	6-10 years n = 3	11+ years n = 7
Format	**f (%)**	**f (%)**	**f (%)**
Online	2 (40.0)	3 (100.0)	4 (57.1)
CD-ROM	0 (0.0)	0 (0.0)	0 (0.0)
PDF	0 (0.0)	0 (0.0)	0 (0.0)
Print Material	1 (20.0)	0 (0.0)	0 (0.0)
Workshops/Staff Meetings	0 (0.0)	0 (0.0)	1 (14.3)
Formal College Course	2 (40.0)	0 (0.0)	2 (28.6)

questionnaires, five (33.3%) educators had 0-5 years of experience, three (20%) of those educators had 6-10 years of experience, and seven (46.7%) of those educators had 11+ years of experience. Of the five educators with 0-5 years experience, 40 percent selected online, and 40 percent selected formal college courses as their preferred choices for delivery of professional development. Print material was selected by 20 percent by those with 0-5 years of experience.

Those three educators with 6-10 years of experience overwhelmingly selected online (100%) as their preferred choice for delivery of professional development. No other format for preference of delivery of professional development was selected by anyone in this group.

Among the seven educators with 11 or more years of experience, 57 percent selected online instruction as their first choice of delivery method. Almost 29 percent of educators with 11 or more years of experience indicated that formal college courses were their preferred choice

of delivery of professional development, and 14 percent indicated workshops as their preferred choice.

Although some educators with 0-5 years' experience showed preference for online delivery, over half of those with 6-10 or 11 or more years experience preferred online delivery.

Chapter Summary

This chapter presented the results of the data analysis and answers to the study's three research questions. Findings were presented in both table and narrative formats. The results of the descriptive statistics answered Research Questions 1, 2, and 3. The respondents indicated that of three media choices that were simultaneously available, including web-based, CD-ROM, and PDF documents, that they (public school educators in Alabama) are especially receptive to the use of web-based delivery of professional development to augment their learning. The summary, conclusions, implications, and recommendations for further research of this study will be presented in Chapter V.

Chapter V

Summary, Conclusions, Discussion and Recommendations

This chapter is organized into five sections. The first section summarizes the purpose and research procedures of this study. The second section summarizes the conclusions drawn from the findings presented in Chapter IV. The third section presents a discussion of the findings and includes discussion of how this study appears to complement characteristics of adult learners. The fourth section presents the implications of this study. The last section suggests recommendations for future studies.

Summary

This study sought to explore which technological delivery media (web-based, CD-ROM, PDF documents as downloadable files for print from the Internet) educators in Alabama public school systems select most often for delivery of their own professional development, why they select them, and whether or not they prefer those modes of professional development to the more traditional modes previously experienced.

In order to gather information regarding the technological media (web-based, CD-ROM, or PDF documents as downloadable files for print from the Internet) Alabama public school educators selected most often for delivery of professional development, the researcher developed a survey instrument (see Appendix A). The instrument was developed because there was no employable instrument available.

The questionnaire which attempted to assess the role of the media for delivery of professional development learning modules was specifically designed for this research. The module project has its own two-part survey, one part consisting of demographics, and the other part having items not related to this study. The primary purpose of that survey is to gain teacher

feedback about the content and format of the modules. To prevent teacher module users from being bombarded with multiple surveys, forcing them to repeat such things as demographic sections, project staff involved with the Alabama professional development (PEPE) program granted this researcher permission to add items to the original survey, and to use certain demographic items which would have been duplicative items in the two surveys. A copy of the enhanced survey can be found in Appendix A.

Items added to the original project survey include Section D, consisting of a series of eight questions related to users' opinions about technological delivery media. The eight item section was one in which the respondent marked one of five Likert-type values for a statement, varying from strong agreement to strong disagreement. Responses were converted to the numerical values of 1, 2, 3, 4, and 5 for statistical analysis.

Section E is also a new section of the survey, added by the researcher. It includes six questions related to opinions on delivery method. Items 1 and 3-5 relate to prior experience with technological delivery methods available to respondents, and their reasons for using various methods. The respondant can check all that apply. The second question is a rank-ordering of five methods appropriate to receiving professional development. The respondant is asked to rank the methods from 1-5 according to his/her preference for each method, with 1 being the highest ranking. Item 6 is an open-ended question allowing respondents to list other reasons for decisions than those previously listed by the researcher.

A pilot study was conducted during the previous school year (2002-2003) to verify the clarity of the questionnaire and to identify unexpected problems. The questionnaire and a feedback form were completed by Alabama participants in a hands-on workshop introducing the modules. Some minor potential problems in instrument administration, scoring routines, and data processing were identified, and subsequent research procedures were refined accordingly.

Theoretically, the study population in this project consisted of all Alabama public school (P-12) educators. However, the sample actually used for the research consisted of educators in Alabama public school systems who completed one or more modules and an online or hard-copy version of an evaluation questionnaire provided by the project staff (which included the investigator). Module users were not required to complete the evaluation form. Completion was voluntary. The sample for the study consisted of 28 teachers from Alabama public school systems. Included were Pre-K through grade 12 schools within the state of Alabama.

The computerized process of data analysis was conducted by using the Statistical Package for Research Software Program (SPSS). The data were organized and entered into the software program as required by the research design. Chi-square tests of significance were intended to be used for Research Question 3 to analyze the relationships between educators' preferences and perceptions regarding delivery of professional development according to groups based on grade levels of school, highest degree received, and years of teaching experience. However, the low number of returned surveys did not yield enough data for the Chi-square tests. Therefore, data for Research Question 3 were presented in table format with frequencies and percentages.

Conclusions

The first research question addressed in the study was: "When given choices among technological delivery of media (Web-based, CD-ROM, PDF downloadable files), which media do educators select most often and why?" Two conclusions can be drawn from pertinant findings:

1. The delivery method most often chosen by participants in this study wasa online (web-based) delivery (82%).

2. Reasons most often cited by respondents for selecting the mediums they chose were:

   a) told to use that medium (73%),

   b) convenience and ease of access (64%), and

   c) control of their own time/schedule (50%).

The second research question was, "Do educators at this point in time express greater preference for self-paced, technology delivered, professional development than for more traditional forms (workshops, seminars, college courses) of professional development activities? Why or why not?" Conclusions relevant to this question are:

3. Educators in the study preferred online delivery of professional development over college courses, CD-ROM, meetings, and workshops (60% of respondents).
4. Reasons given most often for preference of online delivery were:

   a) They favor being able to control their own schedules.

   b) Online or CD-ROM learning is effective for professional development

The third research question was, "Are there differences in the preferences of educators regarding delivery of professional development based on grade levels of school, highest degree held, and years of teaching experience?"

5. Among both elementary and middle school teachers, online delivery was the most preferred method of professional development (67% of respondents). There were no data available for secondary teachers.
6. For the respondents, online delivery was the most preferred method of professional development, regardless of degree level.

7. More experienced teachers participating in this study preferred online delivery of professional development more often than less experienced teachers.

Among "newer teachers," those with 5 years or less of classroom experience, online professional development and college coursework was equally as popular as formal college courses (40% of respondents). For educators with 6-10 years of experience, every vote was for online delivery as the preferred mode (100% of respondents), and those educators with 11 or more years of experience, online delivery of professional development was the preferred mode (57% of respondents).

Discussion

The researcher acknowledges that the sample size in this study was very small. It included only 28 participants from the teacher population in Alabama who completed not only a professional development module, but also the accompanying questionnaire. There could be several reasons for the small sample size. Among them are the following: The researcher was in Tennessee and had no control over module use or questionnaire completion. Further, he had no way of knowing who was using the modules and no way of encouraging questionnaire returns. Also, the location of the link to the questionnaire was on the very last page of every module. Perhaps, teachers after spending up to two hours in study of a module chose to ignore it, or some module completers may never have seen the link.

While the sample size was small, it is clear that more teachers utilized the modules than returned questionnaires. Several participant questionnaires indicated that particular modules had been assigned as readings for their college courses, but it is unknown how many people in

college courses completed modules as readings. Also, 73 percent of the study participants reported that they had been told to study a module as a means of improving performance in a performance area found during PEPE evaluation to be one of their weaker areas. It is likely that a much greater number of other teachers were also assigned modules, since the modules were created for this purpose.

Discussion on Adult Learning

The researcher believes, as the literature suggests, that adults are lifelong learners. As evidenced from this study, fifty percent of participants had 11 or more years of experience, suggesting that educators are continuous and lifelong learners, either by choice or mandate. From a pedagogical viewpoint, web-based learning can contribute greatly to lifelong learning. Web-based learning, as used in this study, provides ongoing and independent professional development opportunities for educators. Self-service learning through web-based, CD-ROM, and PDF files, as used in this study can serve educators, as an as-needed alternative approach to traditional teacher training. In the context of adult learning, the researcher's view gained from this study is that in a self-service learning environment, where learning is available on an anytime and anywhere basis, educators are encouraged to become self-directed, lifelong learners in order to seek out learning material relevant to their ongoing careers. The key, then, is for school administrators to give teachers freedom of choice and/or merge delivery systems such as inservice workshops and online learning in order to facilitate self-direction.

Another perspective derived from this study is that adults desire to manage their own learning. An overwhelming majority of respondents (82%) indicated that they will pursue professional development through web-based delivery, and 50 percent of respondents indicated flexibility of the delivery method as a reason for usage. As self-directed managers of their own

learning, participants in this study actively pursued the knowledge they needed to do their jobs better. Not only were modules available at any time convenient for those participants, but the modules' hypertext format effectively put them in control of the learning pace, the sequence of the content, and assessment of their own progress.

Finally, another perspective derived from this study is that self-directed learning occurs most often in learners' natural settings and is initiated and carried through primarily by the learners themselves. From the study at hand, no respondent indicated he/she did not have access either from home or school to the modules.

Respondents had to initiate and carry through the learning themselves. As previously mentioned, there were respondents who indicated that they were completing the module(s) as part of a college course. Also, there were two questionnaires returned by out-of-state teachers. In the first situation, those in college credit courses clearly were motivated to continue their learning experiences by enrolling in a college course. While their registration in the courses was planned, homework assignments including the professional development learning modules were unplanned parts of the learning environment, parts that course registrants may not have known that when registering. In the second situation, two respondents, one from Vermont and the other from Pennsylvania, were educators who clearly were searching the Internet for some form of ongoing professional development. Locating the Alabama professional development resources was most likely an unplanned event. Nevertheless, learners in both settings were motivated by a need, an interest, or a desire to learn. Alabama professional development modules delivered through the Web had relevance in each situation. The self-initiated activity of utilizing the online delivery of professional development is an example of self-directed learning. Learning in this way is particularly notable since there is no instructor in the learning process.

From the researcher's perspective, adult learners, in this case teachers, have the capacity and ability to be self-directed. Although this investigation was not planned to be a study of adult learners or the applicability of online learning modules to adult learning settings, it seemingly has contributed to the adult learning knowledge base.

Discussion on Professional Development

Processes and activities of professional development must be designed as multiple opportunities for teachers to expand knowledge, skills, and dispositions throughout their careers so they may seek out answers through various learning opportunities. This study found that at different stages of their careers the participant educators selected different types of learning opportunities. Respondents with a Bachelor's degree or less indicated a preference for online delivery, but appeared to find print material, workshops, and formal college courses equally beneficial. More than half of the educators with a Bachelor's degree or less and almost three quarters of those with a Master's degree or higher preferred online for delivery of professional development. Additionally, those participants with a Master's or higher degree clearly demonstrated preference for online delivery and formal college courses. When considering professional development activities, this study found that 36 percent of the respondents indicated a preference for online modules over meetings and workshops and 14 percent of respondents indicated that they still prefer workshop activities because they feel learning is largely a social experience that online delivery does not offer.

While we do not yet have a unifying single model for a professional development system, the modules offered through this study are yet another approach to professional development activity. Modules, as utilized in this study, can promote personal growth, and web-based delivery in the form of customized pre-packaged professional development topics

encourages professional development activity at the personal level, promoting personal satisfaction and professional growth. Results from this study indicate that web-based delivery of professional development is flexible enough to suit users; it offers self-paced, self-selected individualized learning opportunities, provides a format for self-analysis and personal reflection, and has an understandable appeal. In short, web-based delivery is very manageable for educators.

Based on the literature available (Ogle, Branch, Canada, Christmas, Clement, Fillion, Goddard, Loudat, Purwin, Rogers, Schmitt, & Vinson, 2002), the researcher assumes that educators generally participate in at least 8 hours of professional development activity per year. Each of the 15 modules that were available to educators in this study were designed to take 2 hours or less to complete. Actual time spent with each module will vary from person to person, and this study did not attempt to determine the actual time spent by respondents in completing a module. However, if 8 hours becomes a threshold in likely knowledge and skill gains from focused activity, as some research (Holloway, 2003) has suggested, completion of four module topics could substantially impact educators' knowledge and skills. The researcher does not know if respondents took advantage of utilizing modules to meet state mandated hours, continuing education credits (CEUs), or other obligatory hours, or if they did, how many modules were actually completed by any individual respondent.

Several researchers (Trotter, 1999; Education Market Research, 2000; Ertmer, Conklin, Lewandowski, Osika, Selo, & Wignall, 2003; Mathews & Guarino, 2000; Lewis, Parsad, Carey, Bartfai, Farris, and Smerdon, 2000; Jung, 2001) have indicated that newer teachers do not use the computer significantly more than their more experienced colleagues. They point out that one misconception is that newer teachers are more likely to use education technology than their veteran peers simply because they grew up with computers.

A national study (Lewis, Parsad, Carey, Bartfai, Farris, and Smerdon, 2000) found that newer teachers were slightly less likely to participate in use of technology than teachers with four or more years of experience. Similar results from Education Market Research (2000), Mathews and Guarino (2000), and Jung (2001) who each found teachers with more years of work experience are just as likely or more likely to use computer technology than newer educators. This study had similar findings. This study found that fewer than half of the participating educators with five years or fewer of work experience selected online as the preferred delivery mode, but every educator with 6-10 years selected online, and over half of those educators with 11 or more years of experience selected online as the preferred delivery format.

It is the researcher's view that new teachers who have been taught through college coursework, practicums, and internships may feel that the accepted methods of professional development are traditional classes or in-service meetings. Therefore, newer teachers do not veer from that format until they become more experienced teachers and can begin to feel comfortable enough to begin self-selecting alternative modes such as online.

Discussion of Educators' Use of Technology

In the current study, 60 percent of respondents indicated a desire to use technology in professional development. This study found no evidence through respondents' additional comments on questionnaires of difficulties with online learning due to their lack of technology skills. Considering that 73 percent of respondents indicated they were told which delivery method to use to study the modules, it appears that participants in this study do not struggle with technologies such as the use of computer and connecting to the Internet. However, it should be remembered that the sample consisted of only 28 teachers. These individuals may have been

known to possess good computer skills. There may be many other Alabama teachers who would struggle when trying to use this delivery mode.

While this study did not seek to determine whether educators were accessing modules from home and/or their classrooms, it can be assumed that educators had accessed the modules from one of those two locations. One reason that this is probably a safe assumption is that several participants were assigned modules for readings in college courses and may have completed those readings at home and/or at work. A second reason is that several participants were directed to the modules through PEPE evaluators (principals) who work with these persons every day. Also, participants' reasons for choosing web-based delivery method indicated that almost 64 percent of respondents selected it because of convenience/ease of access, and 50 percent indicated flexibility of completing the module on his/her own time schedule. Either of these reasons could suggest that participants could access modules from both home and school.

Participants in this study did not seem to lack basic technology skills. The Apple Classroom of Tomorrow [ACOT] researchers (1995, 2003) and Foshay, (2000), indicated five various stages that educators appear to move through when learning technology including Entry, Adoption, Adaptation, Appropriation, and Invention. The Invention stage is when computer technology becomes educators' primary tool for ongoing professional development. Participants in this study appear to be between the transition stage of appropriation and the stage of invention because they seem to see real benefits in technology for their ongoing learning. Those 28 Alabama educators were utilizing computer technology as a tool for gaining new knowledge and skills through modules. Besides their use of the modules, evidence of their developmental stage is that every questionnaire was returned online.

Additionally, items from questionnaire item E5 that were not marked at all by survey respondents included, "My Internet connection is too slow for use of the online format," I don't

have access to a printer to make hard-copy printouts," and "I had no access to the PEPE website at school/work or at home" and "My Internet connection is not reliable/stable enough for me to use the Web." The lack of agreement with these statements may suggest that participants in this study are not concerned with Internet connections, speed of those connections, and other hardware issues including printers. These participants seemed to be beyond the basics of hardware utilization and accessing the Internet.

Discussion of Media Resources for Delivery of Professional Development

The researcher suggests that participant teachers in this study are most likely to use in the future a number of different media to support their professional development including online, CD-ROM, and PDF as downloadable files from the Internet. Since the study at hand offered PDF documents as downloadable files from the Internet as one mode available for modules, it is likely and assumed that participants downloaded and printed out hard copies of various modules. However, 30 percent of respondents indicated they did not like to keep track of hard-copy printouts, and 20 percent indicated they did not like hard-copy printouts because this process is like reading a text book. This study found that 23 percent of respondents believed that online or CD-ROM professional development is more effective than other methods they have experienced, and only five percent indicated they would not have used these media had there been another option.

Krim (2003) has pointed out that sometimes people do not wish to read learning material from a computer screen. In particular, PDF documents can become unwieldy for learners, if the document contains large amounts of uninterrupted text, which is difficult to read on screen. Results from this study are consistent with Krim's claim. In response to question E5, 30 percent of respondents marked that the computer media offer greater portability. Educators enjoy the idea

of being able to carry with them a CD-ROM and/or hard-copies containing professional development material. The same percentage of respondents indicated that educators do not like to keep track of hardcopies (print) containing professional development material.

These two responses appear to conflict in meaning, but may suggest that educators enjoy "just-in-time" learning through use of the more portable CD-ROMs or web rather than their having to keep track of paper material. These responses could also mean that some educators like the idea of carrying with them either a CD-ROM and/or printouts of professional development material to study while others do not enjoy having to keep track of paper material.

The selection of online delivery as a preferred mode of professional development by participants in this study and their reasons for this choice are consistent with the findings of Zhao, Byers, Mishra, Topper, Chen, Enfield, Ferdig, Frank, Pugh, and Tan (2001), Schofield, Melville, Bennet, and Walsh, (2001), and Jung (2001) that educators either have used and/or are planning to use a variety of media to support their professional development. Those researchers concluded that educators indicate they use or are planning to use technological mechanisms, including digital formats, to support their ongoing professional development, and that they prefer online training to conventional methods because of its flexibility and attractiveness. Apparently, participants are seeking a break from traditional methods of delivery. Additionally, this study found that those educators with Masters' or higher educational degrees clearly demonstrated a preference for two modes: online delivery and formal college courses. More than half of the educators with a Bachelor's degree or less and almost three quarters of those with a Master's degree or higher preferred online for delivery of professional development above all other alternatives offered in the survey.

The researcher does not suggest that digital learning modules should replace traditional media in professional development, but that they should be added to the pool of resources

available. Digital delivery formats for professional development are now being selected as often or more often than traditional formats such as formal classroom and inservice workshops, at least by some teachers, as evidenced in this study.

Other interesting findings were that 23 percent of respondents in this study were not concerned with privacy issues, and 18 percent indicated that they like to work by themselves. Additionally, 82 percent of respondents indicated that web-based learning is effective when utilized as an integral part of a professional development program. Only nine percent of respondents indicated that they would not have used the modules had there been another option.

As noted in Chapter II, research that included simultaneous choices of multiple delivery mechanisms (web-based, CD-ROM, PDF) for professional development could not be located. In this study, the CD-ROM format was not selected even once as a preferred format for delivery by any category of educators. One reason for the overwhelming selection of online delivery might be that CD-ROMs, although made available to the Alabama Department of Education may not have been widely distributed throughout the state. Many of those CDs may never have made it into the hands of educators. Only 18 percent of respondents indicated that a CD version was available to them. A second reason based on survey responses was that many respondents (73%) were told by their supervisors to use online delivery. A third reason for lack of CD use could be the sense that online material is always current while CD content like textbooks is more "permanent" and, therefore could be outdated. There was a survey item regarding the perception of permanence versus temporariness which no respondent checked as a reason for choice of delivery format, but this is still a possible consideration.

Research by Sharma (1998), Rosser, Herman, Risucci, Murayama, Rosse, and Merrell (2000), Deshler, Schumaker, and Fisher (1996), and Dugas, Green, and Leckie (1999), utilized only CD-ROM as the medium for delivery, and those researchers concluded that CD-ROM was

effective, popular, and rated positively by users learning with the medium. However, as previously mentioned, in the current study, no educator selected CD-ROM as a preference for delivery of professional development when given the options of CD-ROM or online delivery.

Rosser, Herman, Risucci, Murayama, Rosse, and Merrell's study (2000) dealt with medical interns and medical practitioners acquiring new skills and knowledge in surgical continuing education. The professional development included video demonstration of surgical procedures. Sharma's research (1998) dealt with learners of English as a second language and included practice of the spoken language along with CD-ROM. Finally, it should be noted that those researchers did not offer users any media choices other than CD-ROM. Participants in this study would probably have used either the online or CD format, if only one of them had been available, or if they had been encouraged to choose. Three-fourths of respondents thought they learned as much from the electronic delivery as they would have from attending a workshop on the same topic. Also, respondents were strong in their belief that professional development delivered online or by CD-ROM is, in fact, more effective than other methods of professional development formats they have experienced, and they liked the flexibility provided by an electronic format.

Other Discussion

It should be remembered that the 28 respondents in this study are not representative of the Alabama educator population and that the results of the study cannot be generalized to the larger population. However, it is interesting to note that two educators, one from Vermont and one from Pennsylvania, found the Alabama professional development modules while on an Internet search for professional development material which they could personally use. Those two surveys were submitted online and included very positive comments about the content of the

online modules and the availability of professional development opportunities in this format. (These two surveys were not included in the study which was restricted to Alabama educators.) Also, the Dean of a college of education from a university in Canada e-mailed the researchers and asked for permission to use the Alabama professional development modules. The intended use was integration into the teacher education curriculum. At least two other education colleges in Alabama have integrated the Alabama professional development modules into their curricula. Those professors are now using various modules as student readings. This use is known because at least three of the returned questionnaires from teachers included a comment that various modules online had been assigned for coursework readings by their professors. While these usages of the online modules were not addressed in the research, they suggest that electronic delivery of professional development opportunities will become increasingly popular, if content and format are carefully chosen.

Implications

This may be the first study to identify participant choices when there is availability of multiple digital media formats for delivery of professional development. The researcher recognizes that the use of self-directed, self-paced online delivery of professional development has not yet become "mainstream" in Alabama, but its development is clearly accepted by some educators. Though the sample was limited to 28 educators in the state of Alabama, the study confirmed that online delivery may have an important future role in professional development of educators.

A major implication of this study is that professional development (i.e., specific customized learning modules) should be added to choices for delivery of ongoing professional development regularly available to Alabama educators. Although Alabama offers traditional

inservice programs and other training and learning opportunities, educators are interested in furthering their professional development through online learning.

Another implication concerns those educators who may lack the knowledge and skills necessary for online delivery. They should be provided opportunity to develop the required technological knowledge and skills through workshops and inservice programs provided by the State Department of Education and/or local education agencies. Even online or CD tutorials might be helpful. They could then take advantage of these new delivery methods.

It would be ideal if Alabama school systems would give continuing education units (CEUs) of credit for those educators who desire to learn or update their knowledge and skills needed through online learning. That would put online learning on the same footing as other delivery modes.

Another implication of this study is that there appears to be a lack of CD-ROM utilization in Alabama. Every school can obtain copies of the professional development CDs used in this study. Many teachers could then copy them if they desired, thereby optimizing the learning choices available. However, teachers were told to use the online versions of the modules.

Yet another implication of this study is that the availability of present and future online and CD learning opportunities will need to be marketed to potential users. This marketing needs to include encouragement to use the products at home or at school.

Another implication of this study is that teacher education colleges need to know about and have access to the Alabama professional development modules. A few institutions of higher education (IHEs) have already begun to integrate the modules into their teacher educator curricula. IHE use of the modules can contribute to a better prepared teacher workforce and prepare future teachers for this form of professional development in the workplace.

The final implication of this study is that the present modules appear to work very well for now, but to keep abreast of professional development needs and changing technology, they will need to be updated. Further, new modules on new topics will be needed.

Recommendations for Future Research

The findings of this study suggest the following recommendations for further research. Such research may enhance the effectiveness of the role of digital media for educators and narrow the gap between theory and practice.

1. Replications of this study should be conducted with larger samples of Alabama educators. The result would be more generalizable information to guide Alabama professional development decisions and strategies.
2. Findings of this study appear to indicate that demographic factors have some influence on Alabama educators' preference of learning mode. More specific studies should be conducted on factors such as gender and subjects taught so that the factors that influence educators' professional development preferences could be better identified.
3. Qualitative research studies should be conducted in addition to quantitative research. Possibly an interview format could be adopted to confirm either the general or specific findings of this study and/or to investigate other considerations, which may influence the educators' perceptions and their rationale for choosing particular learning sources.
4. As was stated previously in Chapter II, there is a shortage of literature and research on educators and their perspectives on specific digital formats for delivery of professional development. This is one area of research which can be pursued in several ways. Therefore, studies should be conducted on the content and format of specific

professional development activities that lend themselves to technological delivery and use in that format by educators.

This study focused on the delivery preferences for professional development among educators in Alabama when multiple formats were simultaneously available. It is hoped that the findings of the study may spark interest in similar research in other states and regions. The message from this research to educators, administrators and policymakers in Alabama and other states is that digital formats for delivery of professional development merit serious investigation, additional research, and further action.

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APPENDICES

APPENDIX A

Survey Questionnaire

Alabama Professional Development Modules

Module Feedback Form

A. General

1. Position: ***Select from List*** 2. School System/ Organization: _____

3. Grade Levels of School *(leave blank if not applicable)*: Lowest Grade **Select** Highest Grade **Select**

4. Predominant Subject Taught *(leave blank if not applicable)*: **Select**

5. Highest Degree Received: ***Select*** 6. Gender: **Select**

7. Years Experience in Education *(do not count this year)*: _____

8. Module Title: *** click arrow at right to select from list ***

9. In completing this module, which format did you use? *(check all that apply)*

☐ Online (web based) ☐ CD-ROM ☐ PDF Format (print format)

Of the module formats used, which format was the predominant one? ***Select***

10. Over what period of time did you complete this module? ***Select***

11. Did you skip any sections or parts of sections of the module? ○ YES ○ NO

If so, which ones? (check all that apply) ■ Instructional section ■ Check your understanding section ☐ Practice activity section ☐ Classroom activity section ☐ Reference section

12. Where did you access this module? *(check all that apply)*

☐ School/Work ☐ Home ☐ Other (specify) _____

13. How many modules in the Alabama Professional Development series have you completed prior to this one? 0

B. *For each of the statements below, please check the box before the number to the right that best describes your experience or judgment.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The content of this module was clear and easy to understand	○ 5	○ 4	○ 3	○ 2	○ 1
2. The content in the module followed a logical order.	○ 5	○ 4	○ 3	○ 2	○ 1
3. The module contributed to my knowledge and understanding in the topic area.	○ 5	○ 4	○ 3	○ 2	○ 1
4. The "Check Your Understanding" activity contributed to my knowledge and understanding.	● 5	○ 4	○ 3	○ 2	○ 1
5. The "Practice Activity" contributed to my knowledge and understanding.	○ 5	○ 4	○ 3	○ 2	○ 1
6. The "Classroom Application" activity appears to be appropriate and useful	○ 5	○ 4	○ 3	○ 2	○ 1
7. The amount of information and work contained in the module was reasonable.	○ 5	○ 4	○ 3	○ 2	○ 1
8. This module was a useful professional development tool.	○ 5	○ 4	○ 3	○ 2	○ 1

C. Please respond to each of the following questions:

1. Why did you select this module for study?

2. What would you like to have seen included in this module or in particular sections of it that wasn't included?

3. What could have been deleted from the module or particular sections of it?

4. What suggestions/recommendations do you have for improving this module?

5. Additional comments:

If this is the first feedback survey you have completed for any module, please respond to the questions in Sections D and E that follow. Otherwise click on the "SKIP" button to skip these sections.

SKIP

D. For each of the statements below, please check the box before the number to the right that best describes your opinion.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Online or CD-ROM learning is effective when utilized as an integral part of professional development.	○ 5	○ 4	○ 3	○ 2	○ 1
2. I prefer online or CD-ROM professional development modules to meetings and workshops.	○ 5	○ 4	○ 3	○ 2	○ 1
3. I would not have used Alabama's online or CD-ROM professional development had there been another option.	○ 5	○ 4	○ 3	○ 2	○ 1
4. I think I learned as much from a online or CD-ROM module as I would have from a workshop on this topic.	○ 5	○ 4	○ 3	○ 2	○ 1
5. I will seek other opportunities to pursue professional development through CDs or online activities.	○ 5	○ 4	○ 3	○ 2	○ 1
6. I prefer online or CD formats for professional development because I can control my own schedule.	○ 5	○ 4	○ 3	○ 2	○ 1
7. I prefer workshops or group professional development because I feel that learning is largely a social experience that online or CD-ROM does not offer.	○ 5	○ 4	○ 3	○ 2	○ 1
8. I believe Alabama's online or CD-ROM professional development are more effective than other methods I have experienced.	○ 5	○ 4	○ 3	○ 2	○ 1

E. Opinions on Delivery Method

1. I have prior experience using the following instructional delivery methods *(check all that apply)*.

   ☐ Online (web based instruction) ☐ Instruction through CD-ROM delivery

2. What is your preference for receiving professional development instruction, assuming that all delivery methods listed below are appropriate to the content you will study? *(please rank the methods from 1-5 with "1" being the highest ranking)*.

   Online (web based instruction)
   Instruction through CD-ROM delivery
   Instruction through printed (hard copy) modules
   Staff development workshops (meetings, conferences, 1-2 day sessions, etc.)
   College or other formal classes

3. For the module topic just completed, the following instructional delivery methods were available to you *(check all that apply)*.

   ☐ Online (web based) ■ CD-ROM delivery ☐ Print ☐ Workshop ☐ Formal Class

4. Why did you choose the delivery method(s) you used for studying the module you just completed? *(check all that apply)*.

   ☐ a. I was told to study the module using this delivery method.
   ☐ b. Convenience/ease of access.
   ☐ c. Flexibility of completing the module on my time schedule.
   ☐ d. I like to work by myself.
   ☐ e. I was most comfortable with this method(s).
   ☐ f. When using this method, I was not concerned with privacy.

5. Were any of the following reasons involved in your decision to use the delivery method(s) you chose for this module? *(check all that apply)*.

   ☐ a. My internet connection is too slow for use of the online format.
   ☐ b. It offers greater portability (I can take the CD or print copy with me).
   ☐ c. I don't like to keep track of hard-copy printouts.
   ☐ d. I don't have access to a printer to make hard-copy printouts.
   ☐ e. I don't like the hard-copy print-out because it is like reading a text book..
   ☐ f. I like to read the material from a computer screen.
   ☐ g. I had no access to the PEPE website at school/work or at home.
   ☐ h. CD's and print copies are "permanent", the web format is temporary
   ☐ i. My internet connection is not reliable/stable enough for me to use the web

6. Other than the reasons above, what other reasons did you have for choosing the delivery method for the module you just completed.

If you wish to keep a copy of your comments, print a copy by printing this web page through your browser. Otherwise, click on the submit button below to complete the survey.

Submit Form | Clear Form

VITA

Joel Wayne McCay was born on July 8, 1955, in Chicago, Illinois. He attended the University of Tennessee, earning a Bachelor of Science degree in Business Education with a Business Minor in 1993, and a Masters of Science in Educational Psychology with a concentration in Adult Education in 1996, and in 2001 completed the Certificate of Distance Education Online Instructor Program from the University of West Georgia .

Mr. McCay has served throughout the doctoral program as a graduate assistant within the Institute for Assessment and Evaluation at the University of Tennessee, College of Education, Health, and Human Sciences.

For the past 5 years he has been a technological consultant for small business, technology trainer for adult learners, and is experienced in Web development for business, church, and educational/learning stand-alone and portal environments including WebCT and Blackboard's CourseInfo.

Mr. McCay has one son, Kenric.